REGD. NO. TN/MS (C) 395

34th YEAR OF PUBLICATION

ISSN 0045/6500

R. N. NO. 1972/57

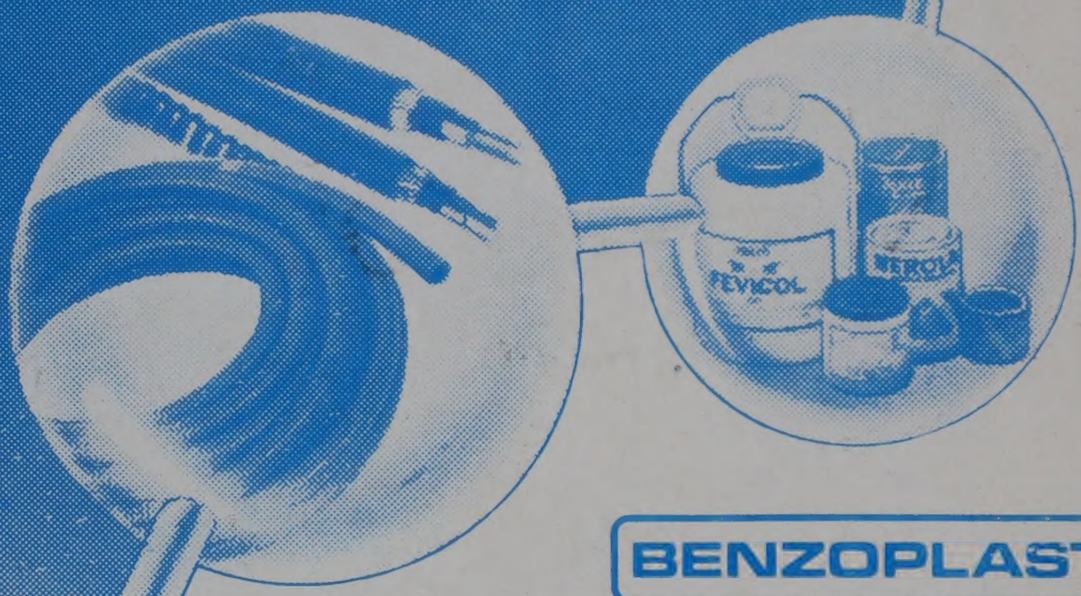
Chemical Weekly

VOL. XXXIV AUGUST 22, 1989 NO. 50

New generation plasticizer is here!

BENZOPLAST™

The superior alternative to DOP



BENZOPLAST™

Improves your quality. Reduces your cost.

Leading manufacturers of PVC leather cloth,plastisol, adhesive, rubber products, PVC footwear, PVC tapes, films etc., are already using BENZOPLAST in place of DOP.

For detailed information, booking orders and technical assistance contact our Marketing Division.

GANESH BENZOPLAST LTD
145-A, Dr. Viegas Street, Kalbadevi Road, Bombay 400 002.
Phone: 2863768, 317993, 253438.

Benzoplast – perfects your products.

The Planet Earth is the greatest chemist we know.

What fecund and creative chemistry.
Every human, plant, animal, rock, gas or liquid on earth has a simple or complex chemistry behind it. The idea of so much thought and unconscious formulation seems mind-boggling, but Nature does it regularly and effortlessly. It inspires us.

Process chemicals for the textile industry for Sizing, Desizing, Mercerising, Scouring, Dyeing, Printing and Finishing.

SUPERTEX™

SUPERTEX®

(INDIA) CORPORATION

132, Dr. Annie Besant Road, Bombay-400 018
Phone: 493 6041, 493 38 18, 493 5482.
Grams: 'Thinogum'. Telex: 75643.

a M.G. Saraf Enterprise
Most trusted name in chemicals.

Connected to one of the oldest industries in the world, which incidentally is also the youngest.

From ancient garments made of bark and hide, through historical finds of Chinese silk and Egyptian cotton at burial sites, to modern fabrics made on computerized looms, humankind's relations with clothes are as old as civilization. From the time when lamp-black, powdered lapis lazuli, red ochre, dye secretions of the banded murex snail, indigo and other plant, mineral and animal dyes have been used, human facination with colouring agents is also well known.
We at Texchem continue this oddyssey, this quest for cloth and its colour.

Process chemicals for the textile industry for Sizing, Desizing, Scouring, Mercerising, Dyeing, Printing and Finishing.

TEXCHEM®

TEXCHEM®

182, Dr. Annie Besant Road, Bombay-400 018
Phone: 498 6011, 498 38 18, 498 5182.
Grams: 'Thinqgum'. Telex: 75678.

a M.G. Saraf Enterprise
Most trusted name in chemicals.

(KN

CHEMICAL WEEKLY

VOL. XXXIV AUGUST 22, 1989 NO. 50

HERALDING THE 21st CENTURY - 26 (a)

Global Ecology on the Brink

Ecology can be defined as a study of the relationship between organisms and their environment. Ecology has still to find answers to some fundamental questions. What, for instance, keeps oxygen at its remarkably constant level of around 21% in the atmosphere, or prevents the seas becoming saltier each year as they receive new burden of minerals from the constant erosion from the land? Is there some chance mechanism at play that enables organisms to adapt in time through the basic mechanisms of evolution to fundamental changes in the environment? Or, on the other hand, could a planet somehow be alive in the sense that this veneer of life on its surface, like the physiological mechanisms in an organism, somehow regulates the flow of nutrients in the system, restoring balances and controlling temperature?

Living organisms, though subject ultimately to the same laws, are deemed essentially separate from the environment in which they live, reacting to it and, through the laws of Darwinian natural selection, adapting as best as possible to it, but affecting it superficially and ephemerally. Life therefore may be seen as a kind of skin with precarious grip on the surface of the Earth, to whose vagaries it has to adapt if it has to continue to survive; truly a struggle for existence.

With the move out into space, the ultimate manifestation of a worldview is already emerging, we have left the Earth and instead of looking back to see how beautiful she is, and how we are a part of her, we see Earth merely as a place from which to conquer the universe. Inherent in our culture is a modern evolutionary theory, a distortion of Darwin's great vision: the notion that living organisms are in deadly competition with another, scrambling for limited resources, the ultimate goal being to leave behind a successful progeny. Paradoxically it was the search for life on Mars that gave answers to such earthly conundrums. Infra red telescopy from Earth showed that Mars atmosphere was dominated by carbon dioxide and that the composition of the gases on Mars strongly suggested that Mars was lifeless.

The process of life would change the chemical composition of the atmosphere so as to render it recognisably different from the atmosphere of a lifeless plant. By comparison, the Earth has an extraordinary atmosphere, far removed from chemical equilibrium and apparently kept in that state from one year to the next. Thus whereas Mars has 95%, Earth has 0.03% of carbon dioxide. Similar sharp differences are found when comparing the planetary compositions of nitrogen and oxygen. Mars has 2.7% of its atmosphere composed of nitrogen and Venus 3.5%. Earth on the other hand has 78%. And while Mars has 0.13% oxygen and Venus has just traces, Earth has 21%. Equally surprising, the Earth's atmosphere has some methane, while the other two planets have none. In essence, the Earth's atmosphere contains oxidizing and reducing gases at the same time. For instance, methane reacts in sunlight with oxygen to produce carbon dioxide and water vapour, and unless methane were constantly introduced into the atmosphere it would soon vanish. For the balance to be maintained some 500 million tonnes of methane must get into the atmosphere each year and 2,000 million tonnes of oxygen to make up that lost in oxidizing the methane. Both those gases are the metabolic products of living organisms, either of methanogenic bacteria or of photosynthesizers.

If Earth were a dead planet and there was no life to inject specific gases into the atmosphere, then knowing the likely outcome of chemical interactions between the atmosphere, rocks and water, the atmosphere would have a similar composition to that of Mars and Venus, with carbon dioxide predominating with neither oxygen or methane and with a small percentage of nitrogen. Just as significant, the surface temperature of Earth without life would lie between that of Venus and Mars. Moreover, it would be uncomfortably hot for life as we know it. Thus, whereas Venus has an average surface temperature of 459°C, and Mars 53°C, Earth without life would have a surface temperature of 290°C +/- 50°C. With life, contemporary Earth has an average surface temperature of 13°C (55.4°F).

This spectacular difference between a burning hot, boiling planet and one with comfortable temperatures for life led the ecologist to the conclusion that life itself has evolved the capacity to regulate the exchange of heat between the Earth's surface and outer space. The process by which life managed to dump carbon dioxide was part of an extraordinary revolution in the then-existing biochemical repertoire of living organisms. Central to it was photosynthesis, involving the capture of light energy to break the strong chemical bonds that bound oxygen to hydrogen and to carbon. Prior to photosynthesis, the first cells that had come into existence on Earth probably derived sufficient energy from the abundant organic chemicals lying around but there were undoubted limits to the quantities of living biomass that could be supported on such nutrients. Photosynthesis linked life to an abundant inexhaustible source of energy in the sun.

If the consumption of carbon dioxide in photosynthesis had been simply a one-way process, then in a matter of a few million years the blanket essential then for keeping the planet warm would have gone. Earth would have been plunged into an inhospitable, frozen state, bringing much of life to a short-lived end. However, just as bacteria such as the cyanobacteria had discovered how to tap and

exploit the sun's energy, other bacteria evolved ways of scavenging and decomposing the excretions and corpses of the photosynthesizers. In a world without free oxygen those decomposers produced methane and carbon dioxide, both of them greenhouse gases, thereby helping to maintain some balance between nutrient and energy requirements and the retention of a greenhouse blanket. The successors of those methane-producing bacteria exist today in the methanogenic bacteria which survive in oxygen free environment such as swamps, septic tanks and in herbivorous animals.

Though oxygen was released, once photosynthesizing organisms began using carbon dioxide as a source of carbon for building up organic structures and providing energy, in the Archean era, it was immediately mopped up by sulphides, iron, ammonium, hydrogen and other reducing agents that were initially present in substantial quantities. Indeed, it was probably crucial for life at the beginning that free oxygen was lacking, otherwise few organic chemicals would have survived long enough for incorporation and use by the first tentative organisms. Finally, some 2,300 million years ago, sufficient quantities of oxygen built up to the point when oxygen could escape freely into the atmosphere. That had a two-fold consequence: first, it hastened the evolution of respiration whereby organisms could use oxygen to metabolize carbohydrates completely down to water and carbon dioxide, thus enabling a far more efficient use of resources; and secondly, by its readiness to form water (H_2O) it prevented the further escape of vast quantities of hydrogen into outer space, a process which if it had continued as during the anoxic period would have left the planet as arid as both Venus and Mars were to become.

Undoubtedly organisms have shown themselves to be extraordinarily opportunistic, evolving with great rapidity mechanisms that would enable them to exploit new potential habitats in the environment. But, as we have begun to glimpse, life in its entirety had a profound impact on the environment, transforming it completely. Thus the evolution and the development of the planet into the multihued sphere that we have seen projected onto our television screens has been a consequence of life, not apart from it.

GAIA, is the Greek name for the Goddess of Earth. Gaia hypothesis came to be formulated after a study of the atmosphere of a dead planet Mars. In principle the hypothesis stated that the Earth has remained a comfortable place for living organisms, for the entire 3,500 million years since life began, despite a considerable increase in the heat output from the sun. Moreover, the atmosphere, despite being composed of an unstable mixture of reactive gases, oxygen and methane for instance, retains remarkable constancy at levels that appear to suit the high metabolic needs of today's organisms. The claim is that we live on "the best of all possible worlds" with living organisms actively and right from the beginning keeping the planet fit for life. Furthermore, the Gaia hypothesis sees the evolution of the species of living organisms so closely coupled with the evolution of their physical and chemical environment that together they constitute a single and indivisible evolutionary process.

In fact, the Gaia hypothesis took on a more complete form as a consequence of the support it received from the eminent biologist Lynn Margulis. Her major work has been to show that symbiosis and cooperation among organisms has always been integral to successful existence, as well as a spur to evolution. Indeed, many of the cellular components essential to cell function in multicelled eukaryote organisms such as mammals and trees -- for instance, the mitachondria for carrying out the oxidation pathway for carbohydrate metabolism, or the plastids for photosynthesis -- appear once to have been free-living bacteria that, following a period of close symbiosis, became wholly incorporated into another organism.

The implication that life is bountiful and rich not simply because it has luckily found a suitable planet but because it has used the special resources of the Earth to create a planet capable of harbo ing living forms, has evoked sharp criticism from many other s entists. Their immediate reaction to the Gaia hypothesis is t planetary self regulation would require foresight and planning the part of living organisms. For instance, the Canadian molecu biologist Ford Doolittle fails to see how the global altruism nee to regulate the Earth's surface temperature or the salinity of the s could ever have evolved through the cold, dispassionate mech ism of natural selection. However, far from being a half-bal theory, the Gaia hypothesis has proved to be eminently testal Thus, the control of carbon dioxide in the atmopshere is brou about through life affecting the rate at which rocks are weather Carbon dioxide in the form of the mild acid, carbonic acid, in acts with calcium silicate in rocks forming calcium bicarbonate silicic acid, both of which are soluble and move through grou waters to streams and rivers and eventually to the sea. Burrow organisms, such as soil bacteria, worms, termites, and trees and ot plants through their extensive root systems both bring and rele carbon dioxide in close proximity to soil and rocks, thereby enha ing the rate of weathering. Meanwhile, in the sea, marine organis such as corals and algae take up calcium bicarbonate and use i make their shells. When they die the shells fall to the bottom gradually build up as sediment into limestone mountains. The mo ment of the Earth's crust in tectonic plate movement may then f the limestone deposit out of the sea so that it forms land. Tho very much of a conjecture at this stage, it is possible that limest formation enhanced if not brought about tectonic plate moven by exerting downward pressure on the edge of coninental shel causing one to subduct under the other. Moreover, limestone as flux material, lubricating the movement of crustal materia is surely of relevance that while Earth, Venus and Mars have canism, only earth appears to have a well-established tectonic p movement.

The burial of carbon dioxide as limestone, while affecting Earth's heat balance, would not per se have any effect on oxy levels, That came about as a result of photosynthesis and the b of carbonaceous matter as in fossil fuels. At present about 100 lion tonnes of carbon are buried each year, equivalent to the rel of 133 million tonnes of free oxygen gas to the air. Not tha content of oxygen in the atmosphere is increasing, since ther plenty of sinks for mopping up any excess: volcanic material instance, or reduced materials in soils. In fact, as much as 9 of the products of photosynthesis are consumed by oxygen-brea consumers, leaving just 2.5% for anaerobes such as methano bacteria. It would appear that the amount of carbon buried each has been steady throughout life's history. Therefore one must as that in the Archean, anoxic organisms such as the methanogens sumed most of the products of photosynthesis, but that as free ox built up in the environment the place of such organisms was t over by respiring consumers.

In the last 700 million years, oxygen has been at its present tionship between carbon dioxide and oxygen levels in the at phere. The amount of carbon dioxide now left in the atmosp if not replaced, would provide green plants with only a few y supply of photosynthetic precursor. Therefore without the con ers to burn off the surplus oxygen and generate carbon dioxid world of green photosynthesizing plants would be short-lived. ertheless, plants have embarked on a plethora of different s gies to prevent themselves being totally consumed, includin production of spines, toxic alkaloids or even of extraordinary tionships with protectorants. Thus once again a balance is r tained and one which is self regulatory in character, indeed w are not needed to give a thought as to whether air would st breatheable, rather we have accepted it for long as a fact o But one wonders today -- how far much longer?

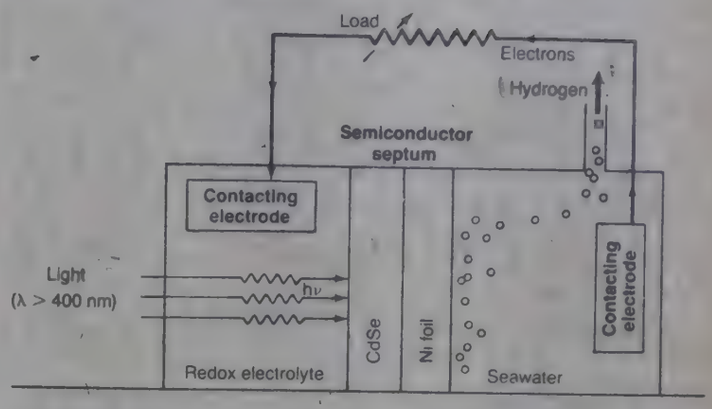
(To be concluded) -- T.P.S. RA

CHEMARENA

S.L. VENKITESWARAN

Hydrogen from Sea Water

A unique way of producing hydrogen from sea water hrough a photochemical cell was reported from Michigan State University scientists at the recent Solar Energy Conerence held in Denver, USA. The green plant uses a chlorophyll pigmented bilayer lipid memebrane to separate two queous phases. The light on the irradiated side of the membranes causes electrons and holes to be separated bringing bout chemical oxidation and reduction on opposite sides of ne membrane followed by a series of further reactions which o not need light. What is done to mimic this reaction is to se pigmented artificial bilayer lipid membranes or a semconductor septum cell. This cell uses a sturdy inorganic nembrane in place of a fragile organic one. The semiconuctor septum electrode consists of a n-type polycrystalline elenide deposited on nickel foil. Two aqueous layers of erro/ferri cyanide and sodium hydroxide are the two sides f the membrane. Metal electrodes in each compartment proide the electric contact. A sketch of the cell is given in the igure.



Semiconductor septum plays key role in photochemical cell that produces hydrogen

Irradiation of the cadmium selenide side induces electronole separation within the layer and makes electrons availole on the dark side for reduction and contacting electrodes complete the circuit. Voltages of 1.6 V and 40 million amp. per square cm have been obtained. For hydrogen production the solute is different on the two sides of the septum membrane. The dark side is filled with sea water and hydrogen is evolved from the H+ ions. The holes move to the cadmium selenide/electrolyte interface where they oxidise ferrocyanide to ferricyanide. The equivalent of energy realised is said to be a good 10% of the incident energy. Much more remains to be done before any commercial possibilities can be examined. (Ref. *C.E. News*)

Catalysts for hydroformylation

Hydroformylation or the oxo reaction of adding carbon onoxide and hydrogen to an olefine to produce an aldede is an important commercial process to produce alcols by further reduction of the aldehyde group -- or oxidation the carboxylic acid. The traditional process using nickel rbonyl catalyst under high pressures has been greatly mproved by using precious metal catalysts. Now a new ethod or catalyst system of Supported Aqueous Phase Catysts (SAPC) has been developed by Virginia Polytechnic stitute, USA.

The SAPC uses organo metallic catalysts that are dissolved an aqueous film on the surface of a hydrophilic solid supt. This film is in contact with an organic phase containg the reactant. Heterogenous catalysis occurs in the pores the support at the organic - inorganic interface. The probn of recovering the high cost precious metal from the conntional method (a homogeneous catalyst system) and vorking it to the active form is avoided by the SAPC system which has a heterogenous catalyst support to keep the reaction going. SAPC catalysts are made by coating a high surface area solid support such as silica with a water soluble metal-organic complex. The water phase is then evaporated leaving the complex distributed over the surface of the support. Water films are then condensed from the vapor phase on the surface of the support in a highly controlled manner. A water film coating results over the metal catalyst complex. The pores in the support are open and accessible. Reactions take place at the interface between the phases and are diffusion controlled. The catalyst is immobilised on the SAPC with large interfacial areas because of the porous character of the supports. Better selectivity between the normal and iso aldehydes is also possible. Many reactions have been carried out such as on oleyl alcohol to the aldehydes (at the double bond) using cyclohexanes as the organic phase. This novel heterogenous catalyst support system may develop into a good alternative to the present homogenous catalyst system. (Ref. *C.E. News*)

SCP -- Single Cell Protein

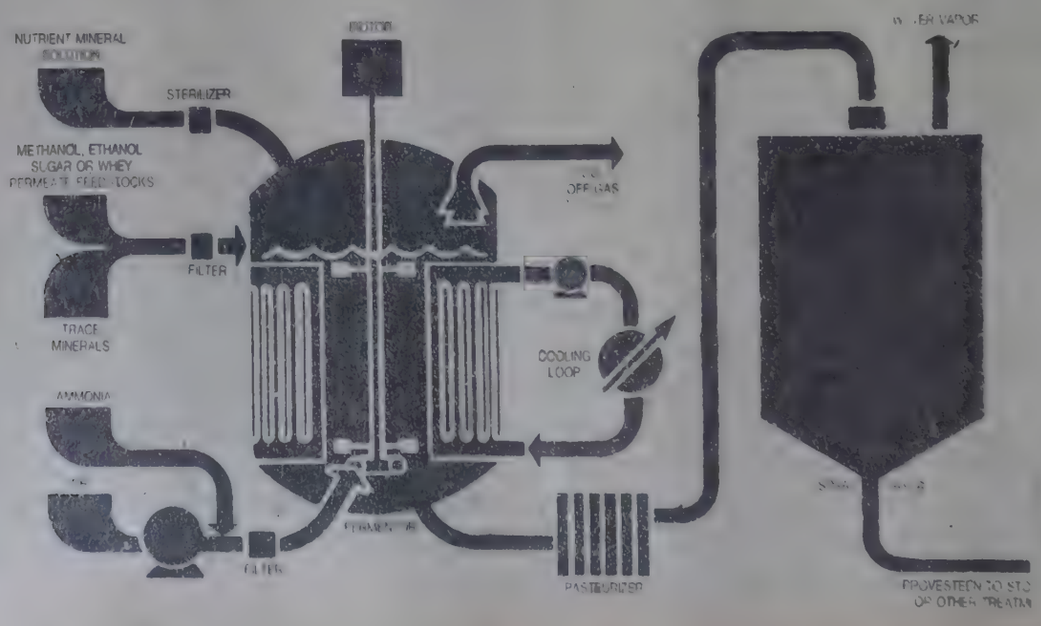
SCP or Single Cell Protein for feed purposes never took off except in emergencies. The supply of cattlefeed has been adequate and at prices which cannot be matched by SCP based on yeast or pseudomonas aeruginosa grown on waste or by-product carbohydrates in Europe. The ability to use hydrocarbons as a feed again raised high hopes in the light of "oil shock" of the Seventies, but again ended up in failure as a commercial proposition. British Petroleum had high hopes to use micro organisms to gobble up the paraffin components of middle distillates to leave a better fraction for diesel fuels besides yielding a coproduct protein for sale. Even a large scale operation was set up in France and was soon wound up.

ICI had higher hopes with their "Pruteen" using a very novel design for the fermenter with more effective air/media contact and consequent lower power requirements. Methanol was tried as the substrate instead of difficult to handle methane gas but nothing could lead to proteen as a viable poposition and the fermenter was shut down and is off and on used for other products such as microbial polymers. There has been a lot of publicity on microbes which can feed on and digest various hydrocarbons and the concept of genetic engineering to produce a master microbe with the ability to use all the different types of hydrocarbons (aliphatic and aromatic) first hit the headlines. But this has only resulted in a method to tackle oil spills on the seas or elsewhere but not a commercial viable SCP as a source of protein.

There is a new trend to promote SCP not as a bulk protein feed supplement but as a speciality product for humans and animals. This is based on work by Phillips Petroleum Co. who have developed the technology for such a product under the name "Provesta". Now Provesta Corpn, Bartlesville, a Phillips subsidiary has commissioned a plant for "Provesteen" which has higher protein and ash and much less lipids a carbohydrates than the conventional SCP. Some of the pr blems associated with the SCP process have been resolv -- separation of cells, taste appeal as feedstuff for huma toxicity problems etc. The process -- Provesta High Cell De sity Fermenter (HCDF) -- has obtained top US Engineeri Award for 1988 -- one of ten. It uses a strain of tomla yea needs no centrifuge to separate residual nutrients, dries high cell density mass directly as a spray. Methanol is substrate with no other organic residuals as in the case molasses. Fermentation is continuous and very efficient w high oxygen transfer rates -- 800 to 1000 millimols per li per hour. Foam is not destroyed by chemicals but used enhance oxygen transfer rate with mechanical breakers. H transfer is of special design to avoid fouling. Productivity claimed to be 3 times that of other SCP processes. Due the very high cell density, separation is not required and o pasteurisation and drying. The plant uses a 25 KL fermer to make 1500 tonnes a year. Provesta flavour is said to substitute for M.S.G. It can also be grown on whey. The p duct is said to sell for $ 2.15 per pound -- no match for cake -- and sells for its special quality and flavour. It is be examined if there is scope for such a high priced prot additive in our context.

An alternate product based on multi-cellular fusari fungus has been developed by British Marlow Foods, j venture of a bread producer and ICI. This is the fastest gr ing microbe and based on wheat starch and said to be "d cious to eat" ICI fermenter for Pruteen can turn out 20, tonnes if there is market. Prices in terms of protein is lo for this product called "Quora" but this is not adequate un the stuff can end up as very palatable foodstuff.

(Ref. *Chem. Business*. June,



NOCIL expansion cost may rise to Rs. 2,000 crores

The cost of NOCIL's mega project for expansion of its ethylene capacity to 3 lakh tonnes at Thane may escalate to Rs. 2,000 crores, according to Mr. Arvind N. Mafatlal, chairman. The original estimate of the cost was Rs. 1,300 crores

Although the Maharashtra Pollution Control Board and the department of environment has granted no-objection certificate and environmental clearance, the project is still being delayed as two writ petitions challenging the expansion of the existing industries in the Thane-Belapur area are yet to be decided by the Bombay High Court. These petitions are expected to be disposed of shortly. The company, in the meanwhile, is pursuing applications for expansion with the central government. The Central clearance is expected in a few months.

Mr. Mafatlal told shareholders at the annual meeting on August 9, that the company would be coming out with a proposal to raise finance for the project shortly after Central clearance. Although the details of the proposal are yet to be worked out there would be a bonus to the shareholders.

The company would be promoting two satellite units, one near Mysore and the other at Pitampur in Madhya Pradesh in view of the proposed expansion of its ethylene capacity. The project near Mysore will be an aromatic unit for the manufacture of aroma and perfumery chemicals. The technical and R & D support was provided by NOCIL for this project.

The Pitampur project will be for the manufacture of BOPP film. This plant is now in an advanced stage of implementation and is expected to go into production by the end of this year. Mr. Mafatlal said the company is giving a major thrust for exports. The company has already achieved an export turnover of Rs. 12 crores in the first four months of the current year as against last year's export of Rs. 13.55 crores.

In the current year, the company's total export would touch Rs. 25 crores. The annual export would grow to a level of Rs. 100 crores soon, he said. Meanwhile, the company has received an industrial licence for the manufacture of two new pesticides namely phosphamidon and DDVP. The plants are ready and trial production has been successful and commercial production is expected to start soon.

The company also obtained a MRTP clearance for its seed business. As regards sales turnover in the current year, the company achieved a turnover of Rs. 120 crores in the first four months of the current year as against a turnover of Rs. 108 crores achieved in the same period of the previous year.

RAJASTHAN PLANS PETRO-CHEM COMPLEX NEAR KOTA

Rajasthan is planning to set up a massive petrochemical complex with a capital outlay of Rs. 4,000 crores near Kota. Announcing this at Bombay recently, the Chief Minister of Rajasthan Mr. Shiva Charan Mathur, said his Government is currently working out the modalities with regard to channelising the availability of gas from Hazira. However, Mr. Mathur was quick to add that much would depend on the availability of gas as Rajasthan has already obtained the sanction for the setting up of a fertiliser plant of 1,300 tonnes capacity at Kota based on Hazira gas.

That apart, he said his Government has signed an agreement with the Neyveli Lignite Corporation to put up a 2,400 mw capacity power plant. Stating that his State has rich lignite deposits, Mr. Mathur said that a fresh discovery of lignite deposits was expected to feed a power house with a capacity of 1,200 mw, apart from the 2,400 mw plant.

Dwelling on the improved power scenario in Rajasthan, he said: "We have stopped purchasing power from Madhya Pradesh and there has been no power cut in Rajasthan during the last 18 months". The commissioning of the fourth and fifth units at Kota ahead of schedule was explicit of the importance shown by the State to power generation he stated. Rajasthan also gets its share of power from the national grid.

On nuclear power generation, Mr. Mathur said already two units are at Kota while a third unit is under construction and a fourth unit has been sanctioned by the Centre. In all, he stated, these units should generate nuclear power of 800-900 mw capacity. By the end of Ninth Plan, when setting up of additional nuclear power plants fructify, Rajasthan will generate about 2,900 mw of nuclear power, he said.

On Rajasthan's achievements, he said Bhilwara has developed into a major textile centre. Currently about 40 per cent of the country's synthetic yarn is being processed there and the expected turnover is more than Rs. 1,300 crores.

The State Government, which currently has offices in the four metropolitan cities for promoting tourism, has now decided to have integrated offices of RIICO (Rajasthan Industrial and Investment Corporation) in these cities where a single-window facility will be made available for industrialists, according to him.

In the above context, he said the Government has sought an acre of land in Bombay at Bandra on a reciprocal basis from the Maharashtra Government. In return, he said, Rajasthan would be willing to give land in Jaipur to them.

Caustic soda prices may fall

Caustic soda price, which shot up above the Rs. 7,000 per tonne level in recent months is expected to drop in early September when Gujarat Alkalies and Chemicals Ltd. (GACL) completes the changeover from mercury cells to membrane cell technology.

The steep price rise in recent times is attributed to disruption of supplies from GACL on account of the transition to membrane cells as well as reduced production from southern units hit by power cuts. Several units took advantage of the shortage to hike their quotations, to the detriment of the consuming industries.

GACL is a leading producer, accounting for a monthly output of about 10,000 tonnes. The change over to membrane cells will not only minimise pollution and reduce power consumption, but will enable the unit to step up its capacity with only marginal addition of balancing equipment. Some other leading producers like Standard Alkali are also planning to change to membrane cells as per the Government directive.

The demand too has been surging. Compared to last year's production of 8.52 lakh tonnes, this year's production is expected to exceed nine lakh tonnes. These figures are inclusive of exports. The industry sold 3.76 lakh tonnes during January-May this year, compared to 3.34 lakh tonnes during the corresponding period last year. The demand has been growing at the rate of eight to nine per cent a year. The demand for chlorine has also been surging and virtually no chlorine is being wasted today for want of buyers.

Exports, unthinkable only a decade ago, is picking up, thanks to a world shortage which has lifted the price to $450 a tonne CIF. Last year, the industry exported 9,940 tonnes. The industry could have exported more but for power cuts in the south. As the export market is in South-East Asia, the major beneficiaries are south-based units like SPIC and DCW. During January-May this year, exports amounted to 8,100 tonnes. As on June 1, the industry has export orders for another 9,000 tonnes.

Many units, especially in the south, are setting up captive facilities, to supplement power supplies from the national grid. No new caustic/chlorine unit for merchant sale is likely to come up in the future, except as part of petrochemical complexes, for captive use.

RIL HIKES LAB PRICE, CUTS RATE FOR PTA

Reliance Industries Limited has raised the price of linear alkyl benzene (LAB) from Rs. 23,000 per tonne to Rs. 27,000. LAB is a basic raw material for detergents. RIL has reduced the price of PTA from Rs. 37,125 per tonne to Rs. 32,625. PTA is a basic raw material for the polyester industry.

The reduction in PTA price follows a directive from the government to DMT and PTA producers to bring down their prices in view of a fall in the price of paraxylene, which is the basic raw material for DMT/PTA. Earlier, Bombay Dyeing has lowered DMT price from Rs. 33,000 to Rs. 29,000 and IPCL and BPL from Rs. 32,000 to Rs. 29,000 per tonne.

DMT and PTA are the basic raw materials for the manufacture of polyester fibre, yarn and film. With the reduction in the prices of their basic raw materials, the government has now called a meeting of PSF and PFY producers at New Delhi to assess the possibility of bringing down the prices of fibre and yarn.

DETERGENTS TO COST MORE

Detergent manufacturers are revising their prices following the increase in ex-factory price of linear alkyl benzene (LAB) from Rs. 23,000 to Rs. 27,000 per tonne, with effect from August 12. As major detergent producers have around one month's inventory, revised prices are expected to be charged on goods to be produced from the second half of September. All producers are watching each other's moves as detergent market is extremely price sensitive. Price has been a major factor in Nirma's success story, and it continues to dominate the market despite Hindustan Lever's crude depiction of it as a hand-burning powder.

This the first time both Reliance Industries Ltd. (RIL) and Tamilnadu Petroproducts Ltd. (TPL) have jointly raised LAB price. Indian Petrochemicals Corporation Ltd. (IPCL), the only other producer, has refrained from raising its quotation. IPCL is still marketing LAB produced more than seven months ago when an explosion forced closure of its plant. The plant is likely to be recommissioned in September/October. The delay in recommissioning is attributed to difficulties in procuring and transporting critical equipment from Europe.

Market reports say that "Wheel" Lever's green detergent powder priced in such a way as to compete with Nirma has carved out a chunk of the market but mainly at the expense of lesser known Nirma imitators. Consumers say that Wheel contains as much insoluble as any other crude powder.

The Reliance backed Sasa is pickin up, after an initial lacklustre perform ance. The Lijjat group, which is pro moting the brand in Maharashtra an Gujarat, is now wooing customers i Eastern India. Another promising bran is "Jaag", the grey powder with 18 pe cent surfactant content (the same as Surf) but sold at almost half the price Unlike Surf, Jaag does not contai colour nor is it spray-dried, factor which do not contribute to product pe formance.

TPL's detergent project in associatio with Henkel of West Germany is in th meantime making good progress. Calle SPIC Fine Chemicals, the new ventu will be the first in the country to pr duce phosphate-free detergents. Use phosphate is banned in many advance countries for environmental reasons

Sandoz to launch two new drugs

ndoz India plans to launch Zaditen Parlodel, the second and third larg-elling drugs of Sandoz worldwide, e Indian market next yeaar.

ditten is an asthma preventive, e conventional drugs which are nistered after the onset of the dis- Parlodel, another Sandoz discov-is used in the treatment of female oductive disorders and Parkinson's se. Other new Sandoz products de Calcitonin (for bone diseases) Hydergine (for psycho-geriatric lems).

st year, Sandoz India launched immun, a drug which helps prevent tion of kidney transplants. This is oz group's largest selling pharma-cal product, with an annual sale h 500 million Swiss francs. The n unit has now introduced pindo-rand name Visken), a beta-blocker h lowers blood pressure while ing a beneficial effect on chloes-levels, thus reducing the chances art attack. No major side effects been reported.

cording to Mr. V.R. Navelkar, of pharmaceutical division, pindo-wers blood pressure as effectively nventional drugs like propanolol, ut their undesirable side effects. It not increaase cardiac output and es peripheral resistance in the y, enabling free flow of blood. It ases HDL (beneficial) chloesterol ecreases the harmful LDL choles- It has little or no effect on triglyc-s, and has a favourable lipid profile.

is is the second beta-blocker being hed this year in the Indian market. eer, ICI India introduced atenolol dname Tenormin), which is the d's largest selling beta-blocker. rding to Mr. A.W. Robinson of oz Switzerland, increasing aware-of its lipid profile and other advan-has made pindolol a best seller in dinavia, Japan, and Australia.

Sandoz India also plans to diversify further into soya-based nutritional supplements for diabetics and other categories of patients. These will be promoted exclusively through doctors. The first product in the nutritional range, Prosan, has been well-received, according to Mr. Nevalkar.

Mr. J.P. Hayoz, Managing Director, said the company recorded a turnover of Rs. 130 crores, a 30 per cent increase over the previous year. Each of the three divisions (pharmaceuticals, dyes and chemicals and agrochemicals) contributed roughly one-third.

The pharma division, which made losses in 1987, is slowly coming out of the red. Turnover of all divisions in the first six months of 1989, at Rs. 75 crores, was higher by 30 per cent compared to the same period last year, he said. Exports have shown a steady increase, progressing from Rs. 7.8 crores in 1984 to Rs. 17.3 crores in 1988. Export orders worth Rs. 28 crores had been booked during the first six months of 1989.

TN PROPOSES TO SET UP MOLASSES-BASED UNITS

The Tamil Nadu Govt. has drawn up a long-term project for starting molasses based chemical industries in the State, the Chief Minister, Mr. M. Karunanidhi said. Declaring open a Rs. 22-crore computerised sugar mill with a capacity of 2500 tonnes per day, he said molasses would become a surplus product in two years when seven new mills would start production and the capacity of 14 other mills would be expanded.

He said the State Government, on its own, had increased the list of backward areas to 105 from 35 even though the Centre did not agree to the proposal. Mr. Karunanidhi requested the Centre to expedite the Karur-Tuticorin broad gauge project and upgrade the Salem Steel plant into a full-fledged steel plant.

DRUGS & PHARMACEUTICALS

Rs. 175-crore export deals with USSR finalised

Soviet Union has finalised deals for the import of about Rs. 175 crores worth of drugs and pharmaceuticals from India in the last few days, it is learnt. A team of officials from MED Export, the Russian agency for import and export of medicines, has been camping at Bombay since the first the week of August. Export deals are for both bulk drugs and formulations and many large and medium scale Indian drug companies have signed up the deals, according to informed sources.

Under the trade protocol signed with the Soviet Union early in April, USSR has already agreed to buy Rs. 198 crores worth of drugs and medicines from India this year. The deals finalised by MED Export now might be in addition to the purchase plan under the trade protocol. With the spurt in demand for drugs and pharmaceuticals from the USSR, total export of these items from India is expected to touch Rs. 900 crores exceeding the target of Rs. 680 crores fixed by the Basic Chemicals, Pharmaceuticals and Cosmetics Export Promotion Council for this year.

In 1988-89 the total export of drugs and pharmaceuticals from India was only Rs. 400 crores. Export circles at Bombay said that the demand for drugs and pharmaceuticals from the USSR is expected to go up substantially in the coming years as well with a projected gap of Rs. 1,000 crores between current availability and demand in that country. A quantum jump in the export of drugs and pharmaceuticals to the US is also likely during the current year with the recent registrations of some drugs from India by the US food and drug administration.

Russia is also buying large quantities of detergents from India this year. It has already booked contracts for import of about Rs. 100 crores worth of detergents recently, the sources said. Under the trade plan provisions, USSR had earlier agreed to buy only Rs. 10 crores worth of detergents.

To meet the sudden spurt in export demand for detergents a leading detergent unit is understood to be setting up a new unit, to meet only the export demand. Two other items for which huge export demand from the USSR is expected are soaps and agrochemicals. Meanwhile the council has set an export target of Rs. 2,100 crores for chemicals, pharmaceuticals, dyes, detergents, agrochemicals, essential oils, crude drugs, etc. for the current year as agai export of Rs. 1,247 crores achie the last year.

The sources said that export o products could even touch the Rs. crore mark during the current yea exporting units are provided wit quate supplies of basic raw ma and other inputs. Many of th materials are currently under supply and exporting units are n to run to their full capacity.

COST ACCOUNTING RULE BE APPLIED TO SMALL D COMPANIES

Drugs and pharmaceutical com in the small sector whose produ subject to Price Control Order (I will come under the purview of t Accounting Records (Formu Rules, 1988, as amended recentl Department of Company Affai

This information was given Industry Minister, Mr. J. Veng to members at a meeting of the mentary consultative committ ched to his Ministry at N. Delhi ly. The amended rules, Mr. R "shall apply to every company in the production, processing ufacture of formulations excepti companies falling under the cat small-scale industrial undertak

Bindal Agro to raise Rs. 500 crores

Bindal Agro Chem Limited has proposed to issue fully convertible bonds for Rs. 500 crores to finance its Rs. 675-crore Shahjahanpur (UP) gas-based fertiliser project. The issue would be made by the middle of October. Announcing the issue details at Bombay recently, Mr. Abhey Oswal, chairman, said that the project would be commissioned by September 1991. He is confident of ensuring a high return on equity capital that would be raised for the project because of the accrual of large share premium fund and the consequent low borrowings.

Mr. Oswal envisages an earning per share of over Rs. 10 from the very first year of operations despite the lowering of the return following recent changes in the fertiliser pricing formula. He said Bindal would be able to "at least maintain the current high rate of equity dividend of 50 per cent on the increased capital".

The company would be offering bonds of Rs. 200 each which would be converted into four equity shares of Rs. 10 each at a premium of Rs. 40 per share in phases. Mr. Oswal said that because of the management's ability to raise bonds and consequently equity shares at a high premium (400 per cent), the project would be profitable from the investor's point of view.

Explaining at length the financing pattern, Mr. Oswal has said that the government has fixed a uniform project cost of Rs. 675 crores for determining the subsidy for all the gas based fertiliser projects with uniform capacity of 1,350 tonnes of ammonia and 2,200 tonnes of urea per day. For the projects, the debt-equity ratio permitted is 2.5:1. Thus for a "normative" project, equity would account for Rs. 198 crores and loans for Rs. 497 crores for financing the project.

However, in the case of Bindal Agro, equity capital would be only Rs. 100 crores and premium — or reserves —would be Rs. 400 crores (on full conversion) and the borrowings would be limited to Rs. 195 crores. The present pricing formula envisages a return of 26 per cent (pre-tax) on equity and 14 per cent on loans thus offering an income of Rs. 121.13 crores on 90 per cent capacity utilisation. The income would increase to Rs. 144.10 crores on cent per cent capacity utilisation. The return is fixed irrespective of the amount of equity capital and the consequent borrowings.

In the case of a "normative" project, the interest outgo would be Rs. 69.50 crores while that for Bindal Agro it is estimated lower at Rs. 27.30 crores in view of the low borrowings. Thus, pre-tax return for a "normative" project would be Rs. 74.60 crores while that for Bindal Agro it would be Rs. 116.80 crores. The minimum tax liability for Bindal Agro would be higher at Rs. 15 crores while that for the "normative" project it would be only about Rs. 8 crores. The net cash accrual, including depreciation (15 year basis) of Rs. 40 crores, is placed at Rs. 141.80 crores for Bindal against Rs. 106.60 crores for others.

Of the Rs. 500-crore bond issue, bonds of Rs. 100 crores would be offered to shareholders on a rights basis in the ratio of one bond for every 25 shares. Of the balance, bonds of Rs. 200 crores would be offered to the shareholders of Oswal group companies on preferential basis. Bonds worth Rs. 50 crores would be offered to NRIs, for Rs. 10 crores to agriculturists and for Rs. 24.75 crores to employees on preferential allotment basis.

The public issue would be for Rs. 115.25 crores. The management is planning to call for only half the amount on application and allotment of bonds and the balance would be called after about 18 months when the implementation of the project would be nearing completion. In other words, the i iate issue would be for Rs. 250 Mr. Oswal said.

The terms of conversion of offered on a rights basis are bett those offered on preferential all and to the public. In the case rights, a sum of Rs. 50 per bond be converted into one equity sh Rs. 10 each at a premium of Rs. share after six months and the b of Rs. 150 into three equity share 18 months from the date of allo In other cases, a sum of Rs. 50 converted into one share aft months, another Rs. 50 into on share after 18 months and the b of Rs. 100 into two more share 36 months from the date of allo

Mr. Oswal claimed that the the Bindal project would be low planned to save costs on cons and the larger use of indigenou and equipment. The compar appointed the government own jects and Development Indi (PDIL) as a prime consultant execution of the entire comple has assured the completion of t ject in 24 months as against th mum period of 32 months fo similar projects.

GUJCHEM DISTILLERS

Gujchem Distillers Indi improved working results for t ended March 1989. The directo stepped up the dividend to Rs. share against Rs. 12 per share p year absorbing Rs. 16.99 lakhs Rs. 12.74 lakhs.

During the year, total sales a receipts amounted to Rs. 11.5 against Rs. 7.39 crores earning profit of Rs. 138 lakhs again lakhs. After depreciation (R lakhs against Rs. 82.55 lakhs) a provisions, the pretax profit ar to Rs. 41.99 lakhs against a Rs. 76.65 lakhs.

ONSIGNMENT TAX

Panel mooted to study alternative

The Associated Chambers of Commerce and Industry (ASSOCHAM) has ged the Government to appoint an pert committee to suggest an alternave to the proposed consignment tax hich could collect revenue without disrbing the regional imbalance or caus-g distortion in the existing pattern of ter-State trade.

The introduction of the Bill for levy tax on consignment transfer should deferred till the recommendations of e proposed committee are made avail-le. Alternatively, the Bill should be ferred to a select committee of Parli-ent as per the assurance given by the nance Minster while presenting the onstitution Amendment Bill on the bject in 1987, so that trade, industry d the consumer get an adequate portunity to put forward their views, release said.

ASSOCHAM said that with the roduction of the consignment tax, vestment flow to the smaller States hich lacked large consumer markets or clusive supply sources, would be ally stopped. For instance, in smaller ates like Jammu and Kashmir, Har-na and Kerala, the manufacturers ould find it difficult to bring in raw terials and to take out finished pro-cts at an extra cost of eight per cent. a result, these States would become pendent on the larger States for pply of consumer goods.

The inflationary impact of the con-nment tax, ASSOCHAM said, would equally pernicious. Apart from the ect cascading effect of the tax on fin-ed products and consequently on the ports, the tax would lead to fragmen-ion of capacities as it would be nec-sary to have separate manufacturing its in diferrent States. ASSOCHAM id that consignment tax would also sult in rampant smuggling and corrup-n at the State borders.

PUBLIC SECTOR FERTILISER UNITS RUN UP LOSSES

Many units of the public sector fertiliser corporations have incurred huge losses in 1988-89, according to the provisional accounts. Hindustan Fertiliser Corporation's Namrup-I and II have together incurred losses of Rs. 45.34 crores and Namrup-III Rs. 18.23 crores. Its Durgapur and Barauni units have shown losses to Rs. 53.62 crores and Rs. 42.61 crores respectively.

As regards the Fertiliser Corporation of India, its Sindri, Gorakhpur, Ramagundam and Talcher units have recorded losses of Rs. 21.75 crores, Rs. 19.08 crores, Rs. 26.43 crores and rs. 66.34 crores respectively. National Fertiliser Limited's Bhatinda and Paradeep Phosphates plant have lost Rs. 7.24 crores and Rs. 7.92 crores respectively. The losses in HFC and FCI plants have been attributed to low capacity utilisation on account of power and labour problems.

RESOURCES: OIL SECTOR LIKELY TO EXCEED TARGET

The Oil Industry plans not only to meet its own requirements from its resources but also to contribute to the general pool during the 8th Plan. The industry is expected to exceed the 7th Plan target for generating internal resources, the Petroleum and Natural Gas Secretary, Mr. H.K. Khan said in New Delhi while inaugurating the 5th Oil Industry Finance meet. He said the oil companies have offered to raise loans to meet the cost of their projects when the country is facing a resource crunch. Financial directors of oil companies will have to play an important role in ensuring that such performances are to the best advantage of the country he said.

FACT closes ammonium chloride plant

The ammonium chloride plant of the Fertilisers and Chemicals Travancore Limited (FACT) has been closed. FACT is of the view that the plant cannot be recommissioned with the present condition of its structure. This was the only Central public sector unit producing ISI standard ammonium chloride.

However, there will be no effect of the closure of the plant on the price of ammonium chloride used for agricultural purposes and to the farmers at statutorily-controlled price.

FACT proposes to take up during the Eighth Plan revamp and rehabilitation schemes costing Rs. 472.4 crores. These include replacement of ammonia plant at Udyogamandal, phase II expansion of the NPK plant of the Cochin division, revamping of the urea plant and energy conservation.

FACT also proposes to take up several new projects in collaboration with state governments and private entrepreneurs. These include projects for aniline and downstream products, melamine, bisphenol and polycarbonate, titanium dioxide and ethylene, downstream units, and the manufacture of building materials from gypsum. The total cost of these projects is estimated at Rs. 264.2 crores.

Manufacture of pipelines for petroleum products and hypodermic needles is also proposed to be taken by FACT. The FACT Engineering and Design Organisation (FEDO) had submitted an offer for a phosphatic fertiliser complex at Palmyra in Syria. Its offer for the Asmidal fertiliser complex is also under consideration of the Algerian government.

During 1988-89, FACT made tremendous improvement in production and capacity utilisation. During the year, production of nutrient nitrogen reached 2.77 lakh tonnes against the previ best of 2.38 lakh tonnes achieve 1986-87. The capacity utilisation c to 104 per cent against the previous of 89 per cent.

The production of nutrient P during 1988-89 came to 1.35 tonnes against the previous best of lakh tonnes achieved in 1987-88. capacity utilisation also went up f 85 per cent in 1987-88 to 89 per in 1988-89.

Profit for 1988-89 after depreci is estimated at about Rs. 28 c against Rs. 15.62 crores in 198 The profit would have been higher government had continued its old r tion price for fertilisers.

During 1988-89, sales reached lakh tonnes against 10.80 lakh ton the previous year. The sales turn including subsidy, at Rs. 394 crore istered a 6.7 per cent increase ov turnover of Rs. 369 crores in 198

Revised formula for oil retention price sought

The oil companies have demanded that for calculating retention prices their capital base should be arrived at after taking into account the requirements of modernisation, replacements and expansion.

The method of considering the historical cost data should also be changed so that the capital base of all the companies is enlarged uniformly.

An aide memoire on "Incentives to the oil industry for better performance", prepared by the oil industry secretariat for presentation to the government, has brought out several drawbacks of the existing retention pricing mechanism that hamper generation of internal resources.

It has been pointed out that under the present system, capital employed is taken as the sum of net fixed assets (NFA) and normative working capital (NWC). The NFA is based on historical costs, which is based on an old refinery, resulting in very low capital base.

This does not help the refinery to generate adequate resources for modernisation and improvement and there is no real incentive for the companies to keep the project costs down since a larger capital base means a larger return.

It has been suggested that the normative working capital should be worked out more scientifically taking into consideration the pecularities connected with the individual refineries and companies.

At present, the normative working capital is determined on the basis of the type of crude processed only. Other factors like locational disadvantages causing piling up of stores and spares, build-up of finished products due to market constraints, build-up of insurance spares to support the modern technology and the like are not given due weightage.

Another change has been suggested in the borrowing norms for calculating returns. At present, the total capital employed is bifurcated into networth and borrowings for the purpose of calculation of return. While the return on networth is fixed at 12 per cent post-tax, the return on borrowings is based on the actual average interest rate.

Thus, if a company reduces its interest cost through effective cash management, no benefit is given to it since the actual average interest rate is adopted for the return.

It has been suggested that a standard interest rate should be fixed for calculation of return depending on the money market and the standing of the individual company in the overall scheme of things. This would enable the companies doing better to retain the benefit.

A change in the method of calculating incentives for higher throughput by refineries has also been suggested. Presently, in case a refinery achieves higher throughput than the standard level, it is allowed full margin as applicable for the standard throughput.

The full margin, however, is based on the networth and borrowings of the base year as given in the pricing circular. The return on networth is recalculated every year based on the published financial accounts of the company.

The revised return so worked out is not given on the basis of tonne rate. Consequently, such increased return is denied on the excess throughput.

It has been suggested that the additional return on networth, based on published balance sheet, should be paid on the incremental throughput also.

More forex sought for crude oil import

The petroleum ministry is moving the Cabinet for higher allocation of foreign exchange for import of crude oil and petroleum products during the current financial year. This follows the finance ministry's attempts to curb imports of these items in view of the tight foreign exchange position and the high rate of consumption observed in regard to certain products.

The petroleum ministry has found that if the imports are to be restricted to the levels suggested by the finance ministry, severe curbs will have to be introduced on consumption of motor spirit and diesel oil. During the first quarter of the current financial year, the consumption of motor spirit went up by 13.9 per cent. This will have to be brought down to 1.4 per cent between July-March 1989-90, if the finance ministry's instructions are to be followed.

Similarly, in case of diesel oil, the consumption rate between July-March 1989-90 will have to be brought down to 4.3 per cent against 10.8 per cent during April-June 1989-90. Bringing the consumption of motor spirit and diesel oil down to such levels is not considered possible by the petroleum ministry for several reasons.

First, curbing consumption would mean closing down some of the retail outlets which will create hardship for the people. Secondly, the coming rabi season will require large quantities of diesel for water lifting and harvesting. Agricultural production is bound to suffer in case curbs are introduced on consumption of diesel.

Thirdly, with the elections scheduled to be held in a few months time, the consumption of motor spirit and diesel oil are bound to go up as thousands of candidates launch their campaigns. If the petroleum ministry's plea is accepted by the Cabinet, there will have to be big increase in the import bill on account of crude oil and petroleum products this year compared to last year.

During 1989-90, the import bill for crude oil and petroleum products came to Rs. 3,565 crores. The import bill this year was earlier estimated at about Rs. 5,340 crores. This was, however, based on the assumption that the crude oil prices will remain at an average of about 16 dollars a barrel. However, if the prices firm up by about a dollar a barrel, the import bill will jump up by another over Rs. 300 crores.

IBP TO MARKET CAUVERY REFINERY PRODUCTS

IBP Co. Ltd., a public sector oil company, has been allotted storage and distribution facility of oil products of the refinery being set up by Madras Refinery Ltd. (MRL) at the Cauvery basin near Panangudi in Tanjore district, Tamil Nadu. The company General Manager, Mr. R.T. Chiklia, told newsmen that the half-a-million tonne capacity refinery is estimated to cost Rs. 126 crores. Hitherto crude oil from the Cauvery basin was transported to Madras for distillation.

Mr. Chiklia said IBP was setting up its first refinery in Assam. A subsidiary company will be formed along with the Assam Government for executing the Rs. 1,000-crore project during the Eighth Plan. Preliminary works have already been started.

Mr. Chiklia, who inaugurated the Bangalore divisional office of the company, said the divisional office would look after outlets of the company located in Karnataka, Tamil Nadu, Pondicherry and Kerala. It had 38 retail outlets in Karnataka and another eight outlets will be opened shortly. The first storing depot in the South will be opened at Charlapali near Hyderabad.

HARSHVARDHAN CHEMICALS

Sulphuric acid project on schedule

Harshvardhan Chemicals and Minerals Ltd. has maintained 10 per cent dividend for the six-month period ended March 31, 1989. Sales of the company for six months amounted to Rs. 168.77 lakhs as against Rs. 555.25 lakhs in the previous full year ended September 30, 1988.

The company has shown profit before interest and depreciation of Rs. 31.03 lakhs for six months as against Rs. 67.38 lakhs in the previous year. Profit after tax worked out at Rs. 17.06 lakhs as against Rs. 44.63 lakhs in the previous year. It has obtained sanction of term loan of Rs. 700 lakhs from all-India financial institutions for its proposed sulphuric acid project, which is estimated to cost Rs. 1,285 lakhs.

It has obtained consent to go for rights issue of Rs. 407.93 lakhs by offering 2,71,950 — 14 per cent secured fully convertible debenture of Rs. 150 each for cash at par including five per cent preferential allotment to employees of the company. Rs. 75 per debenture will be converted into five equity shares of Rs. 10 each at a premium of Rs. 5 after 12 months of allotment and the remaining Rs. 75 per debenture will be converted into five equity shares of Rs. 10 each at a premium of Rs. 5 after 18 months of allotment.

Mr. Ramsinh Rathod, Chairman of the company, explained that the object of the rights issue is to raise part finance of Rs. 324 lakhs for the capital cost of sulphuric acid project and Rs. 64.50 lakhs to partly finance the working capital margin for detergent project.

The implementation of sulphuric acid project has already commenced since April and the project will be completed by September, 1990 to produce 55,000 MT of sulphuric acid, 5,000 MT oleum, 5,000 MT of chlorosulphonic acid and 5,000 MT of stabilised S

The heat generated by burning phur in sulphuric acid project will g erate power of 1.7 mw which will s the power requirements of all the t divisions of the company, i.e. fertili chemicals and detergents and ther the company will improve its prof bility by saving in power cost.

The sulphuric acid, used for manu turing detergent product, will g required diluted acid for fertiliser d sion, which would reduce the input of acid in this division and thereby fitability will also improve.

CEMENT UNITS PREFER PL TIC PACKAGING

Cement units are flouting the m datory jute packaging order in t efforts to woo the consumer in a g ridden, competitive market. The Packaging Material Act (JPMA) 1986 reserved 70 per cent of cer packaging for jute, leaving 30 per for plastic. Today, almost 40 to 50 cent of cement is packed in plastic b according to well-placed sources. has provided some measure of reli several sick plastic units which survived JPMA.

Dealers have reported difficulti selling jute-packed cement in the of aa universal preference for the r durable plastic bags. Because of s age during handling and transporta the consumer invariably loses ou weight in the case of jute bags. Anc attraction is the resale value of syn tic bags. Despite a fiscal stru designed to make plastic sacks unc petitive, they are approximately che than jute bags by Rs. 1.50 per piec handful of plastic units have suc fully turned to the export marke adapting their looms to process p propylene instead of the cheaper inferior HDPE.

Goodlass Nerolac shifts location of new unit

The Goodlass Nerolac Paints Ltd. has cided to shift the location of its pro- sed new unit from Haryana to Uttar adesh for the manufacture of paints, rnishes, enamels and synthetic resins.

Simultaneously the company has also vised the project cost upwards —from 20 crores to Rs. 9.50 crores. The in- ease in the cost is attributed to the de- elopment cost and nature of building.

Both these changes have been pproved by the government. The orig- al location and project cost of Rs. 6.20 ores were approved as far back as 987. The new location of the project in Kanpur Dehat in Uttar Pradesh as gainst Rewari Tehsil in Mohindgarh istrict of Haryana.

Consequent upon the locational hange to category 'A' backward area, e company will now have no export blication as was earlier imposed by the government. The capacity proposed in the project is 15,000 tonnes per annum of paints, varnishes and enamels. In the revised scheme the company has also included synthetic resin for captive consumption with a capacity of 4,800 metric tonnes per annum.

The project cost of Rs. 9.50 crores will be met by equity capital on rights basis of Rs. 2.20 crores; debentures Rs. 3.35 crores; loans from FIs Rs. 3.35 crores and foreign exchange loan Rs. 60 lakhs.

The company had argued before the government that it was very difficult to explore the export market and that was one of the reasons for its changing the location of the project to a category 'A' backward area, an argument with which the Centre had concurred resulting in the deletion of export obligation clause.

In its order the government has told the company that the new factory shall be 25 km from boundary of the standard urban area limit of Kanpur city and beyond 50 kms from the boundary of the standard urban area limit of Delhi.

The company was further told not to manufacture those items which are reserved for exclusive development in the small-scale sector.

PETROFILS PLANT SHUT DOWN

Petrofils Co-operative Limited has shut down its plant at Baroda following an indefinite strike by the non-supervisory employees from August 7. According to the management, the strike started without any due notice and is illegal as per the Industrial Disputes Act.

The company is a joint venture of the Union Government and Co-operatives manufacturing plant for production of polyester filament yarn.

A rapid wrap-up of what's new in Operations, Processes and Products

Surfactants -- A time for novelty

Surfactants play an important role in agrochemicals, polymers, biocides, pulp and paper, road making, personal products, etc. Biosurfactants are likely to be produced on a larger scale. In oil recovery an aqueous suspension of chosen microbes injected down the well, obligingly produce both surfactant and gas and lowering the interfacial tension. A surfactant produced by the yeast *Torulopsis Magnoliae*, fed on fatty acids, hydrocarbons, glucose, yeast extract, urea, etc. separates out from the aqueous solution and thus the recovery becomes delightfully simple.

Acetylenic glycols as a new group of surfactants (Surfynols) have been introduced by Air Products in USA. Polymeric surfactants behave in a different way. An area of colloid chemistry which has been the subject of much recent interest is the three phase water/oil/water emulsions. A-B-A block copolymers of poly(12-hydroxy stearic acid) and polyethylene oxide have been found to be successful and may well be exploited industrially.

Phase Transfer Catalysis (PTC) continues to find new applications and polymerization by means of PTC hs been extensively developed -- liquid crystals; condensation polymerization -- here the product is perfectly predictable, random chain ends are eliminated and an exact stoichiometric balance of reactants is not needed. For higher temperature applications new catalysts based on 4 dihexylamino pyridinium quats (e.g. with CH_2-C $(CH)_3$) have been developed which work even at 150°C. It is possible to recover these quats with aq. HCl in which these are soluble.

Dioctyl sulphosuccinates, obtained from EHA and maleic anhydride, continue to be important and even for oil spills in oceans these are useful. (J. Hart, *Chem. Ind.* 1989, No. 12, 19 June, 384-388).

Chiral Synthesis (CS)

CS is becoming increasingly important. It is said that by the year 2000 almost 55% of drugs will be optically active compared to 12 to 13% in 1984. This strategy will also be applicable to agrochemicals. For drugs by 2000 the market value may well be $ 2 to 5 billion. A variety of techniques -- resolution of racemic mixtures, enzyme methods, asymmetric catalysis, synthesis from chiral pools will be used. R. Sheldon (of Andeno in Holland) gave the example of D(-) phenylglycine at 1000 tpa via resolution of the racemic mixture, obtained from benzaldehyde, HCN, and NH_3 with (+) camphor sulphonic acid. The recycling of L (+) isomer via racemization is obviously important. For some substances it may well be possible to carry out simultaneous resolution of the unwanted isomer when the isomer remaining in solution can be induced to spontaneously epimerise. Kinetic resolution depends on the differences in the rates of each enantiomer. Enzymatic resolution is used for both D and L aminoacids. e.g. D-value is obtained through this strategy and is used to make the broad spectrum pyrethroid insecticde Fluralinate.

Marko and Sharpless have recently introduced asymmetric dihydroxylation of olefins using catalytic quantities of osmium tetroxide in the presence of N-methyl Morpholine-N-oxide as oxidant and dihydroquinidines of quine as chiral catalysts. (*Chem. Ind.* 1989, No. 12 (19 June), p. 366).

Can Polystyrene (PS) be optically active?

Wulff and Dhal have reported the first synthesis of optically active PS with $[\alpha]^{30}_{365}$ as large as -3.5°. An optically active template compound (D-mannitol derivative containing two *p*-vinyl phenyl boronic acid groups) was copolymerised with styrene. Subsequently $B(OH)_2$ group is reduced. (*Angew Chem. Int. Ed.*, Engl. 1989, 25, 1961).

Carane aldehydic acid lactone (CAAL)

CAAL is required fr pyrethrolone insecticides and can be made by ozonation of *cis* chrysanthemic acid in an acidic medium and reductive work-up by Zn powder; EtOAC was used as a solvent. (*Chem. Abstr.* 1989, 110, 227174).

Hofmann reaction

Mgeladze et al (from USSR) have shown that long chain fatty amides ($>C_{14}$) can be treated with Br_2 and KOH to give acylakyl ureas (RNHCONHCOR) which when treated with HCl or KOH gave RNH_2 in 68-86% overall yield. A mixture of cyclic amines was prepared from

the acidol naphthenic acid fraction. (*Chem. Abstr.* 1989, **110**, 231062).

High activity low Ni content catalyst

Crossfield (a Division of Uniliver) has developed a very active low Ni content supported catalyst which can be used for a variety of hydrogenations. The key lies in having a large pore alumina support where the pore size distribution has been optimised. (*ECN* 1989, 26 June, p. 18).

2,3 Dimethyl butene-1 (DMB-1)

B.P. have patented a process where propylene is dimerized with Ni acetylacetonate tricyclohexylphosphine in toluene as a solvent to give DMB-2, which in turn is isomerised to DMB-1 (on 10% Na on alumina).

Simulation of an industrial reactor for orthoxylene oxidation

Nikolov and Anastasov have given a very useful account of the effect of the coolant temperature on the yield of phthalic anhydride (PAN) as well as the formation of by-products (maleic anhydride, benzoic acid, phthalide, *o*-toluic acid). An industrial reactor containing 9000 tubes, 3500 mm long and 25 m i.d. was used. The amount of coolant (molten $NaNO_2 2KNO_3$ salt) was 72,000 kg. A vanadia-titania catalyst was used. It is interesting to find that an increase in the coolant temperature under some condition improves the quality of PAN. (*A.I.Ch.E.Jl.* 1989, **35**, p. 511).

Distillation

Recent developments

Chen (of Glitsch) and Chuang (Univ. of Alberta) have given a review of recent developments w.r.t. new design practices, new contacting devices and new applications for existing contacting devices and new troubleshooting techniques. Structured packagings are now gaining increasing importance as a good alternate or supplement to trays and random packings. The importance of supports, vapour distributors and liquid distributors has been brought out. There is an interesting Asian adage cited for liquid distributors is that if one's first step is wrong, 99 wrong steps will follow. Desirable features of the structured packings are given. Features of high performance screen trays are given. Some case studies pertaining to poor perforance of a heavy water plant, upgrading a styrene tower, debottlenecking an ester still in a DMT plant and upgrading of KA oil (cyclohexanol + -one) column, etc., are given. (*Hydrocarbon Processing* 1989 Feb., p. 37-45).

Maleonitrile from fumaronitrile

This isomerization has been claimed by Dow in an iner nitrile solvent R $(CN)_n$ (n = 1,2) at room temperatur in the presence of a base like KOH. (*Chem. Abstr.* 1989 **110**, 231131).

Gas phase chlorination of chlorobenzene

It has been claimed that the gas phase chlorination give predominantly *para* isomer when alkali metal exchange zeolites like Offreitite/Erionite are used. (*Chem. Abstr* 1989, **110**, 231186).

2,4,6 Trichlorophenol (TCP)

Rhone-Poulenc have claimed that 2,6-dichlorophenc when chlorinated with $Bu_4 N^+Cl^-$ at 70°C, 97.1% TC is realised. (E.P. Appln. 299,890, Jan., 1989. *Chem. Abst* 1989, **110**, 231270).

Selective trimerization of ethylene to hexene-1

Union Carbide Scientist J.R. Broggs has shown that homogeneous three-component catalyst of Cr, hydr lysed RA1 and dimethoxyethane allows trimerization ethylene to hexene-1 with 74% selectivity. (*J.C.S. Chem Commun.* 1989, 674).

***ortho* Alkylation of phenol (P) and hydroquinor (HQ) with alkadiene-formation of cyclic ethers**

Laan **et al** have continued their studies on *ortho* alky lation of phenols with monoolefins in the presence aluminium phenolate as a catalyst. Now they have stu died reactions of P, HQ and 4-methoxy phenol wi easily available dienes like isoprene, cyclopentadien 2,3 dimethyl butadiene, dipentene, etc. In most cases hig yields of cyclic ethers were realised. (*Chem. Ind.* 198 5 June, p. 354).

Crystallization (C) for bioseparations

Cussler **et al** have reviewed the subject of C with sp cific reference to bioseparations. Crystals are often sy onymous with purity and uniform size crystals flo properly. The importance of population balance for pr dicting crystal size distribution has been brought ou Sometimes recrystallization becomes necessary to rea ise a product of specified purity and specs with refe ence to impurities. There is dearth of information

crystallization in a batch system for organic materials. (*Chemtech.*, 1989, June, p. 376).

Promoting organizational excellence

J.G. Lownstein (of FMC Corpn., USA) has given a mini-treatise on this subject where conceptually the judgement is passed by the customer or client. There has to be a passionate attachment for practicing and promoting excellence. Excellence is accomplished through leadership, not through management. A list of things FMC purports to do is given. Some statements worth quoting are "Abolish petty rules" "be inventive. Do something unexpected – even something courageous". (*Chemtech.*, 1989, June, p. 328).

A new flue gas desulphurization (FGD) process

Flue gas is contacted with an aqueous solution containing 10-20% sulphuric acid and 1 wt% bromine which converts dissolved SO_x to H_2SO_4. H_2SO_4 is concentrated and sold and HBr is electrolysed and Br_2 recycled. A pilot plant is operating in Sardinia, Italy. (*Chem. Eng.* 1989, **96**, No. 6, June, p. 21).

Clay catalysis: Enolthioethers from cyclic ketones

Labiad and Villemin have shown that montmorillonite KSF in refluxing toluene catalyses the synthesis of 1-alkyl- and 1-arylthio alkenes from ketones and thiols (thiophenol or 1-butanethiol). *Synthesis*, 1989, No. 2, p. 143).

Dewatering of biological slurry by using water absorbent polymer gel (WAPG)

Huang et al have developed a new concentrating/dewatering process which utilises a suitable WAPG. This gel should be very porous for rapid water absorption and at the same time of large size, to provide easier separation. Poly (vinyl methyl ether) gel was fund to be suitable. Microbe-rich organic slurry can be dewatered by this "gel dewatering process". (*Biotechnology Bioeng.* 1989, **34**, 102).

Scale-up challenge holds back biotechnology

Dr. R.A. Richards and Dr. D. Roach have brought out the merits of biotechnology and its limitations. Traditional biological routes to chemical production are: Extraction: sugar, menthol; Fermentation: Cirtic acid, amino acids; Whole cell biotransformations: ephedrine, vitamin C; Enzyme biotransformations: High Fructose Syrup, semi-synthetic penicillins. Enzymes are powerful and specific catalysts which work at close to ambient conditions; stereo- and regio-selectivity can be realised and novel molecules can be synthesised. Chiral intermediates are now receiving serious attention: e.g. C_3 synthons: (R) Isopropylidene glycerol, (R) Glycidyl butyrate, (S) Epichlorohydrin, (R) 3 Chloro 1,2 propanediol.

There is now increasing pressure to produce drugs and agrochemicals to provide optically active isomer even though the unwanted optical isomer may be benign. (*Performance Chemicals* 1989, April, p. 14).

Technology in competitive strategy: Lessons from the chemical industry

Chakrabarti and Eakabuse have given a treatise on this subject. Overall competitive strategies require both corporate and technological strategies to provide a firm with sustainable, profitable position. Changes in technology can lead to product obsolescence (e.g. vacuum tube and slide rule). The pertinent questions are: (i) should an organization be aggresive in its technology strategy? (ii) should it be a technology leader or follower? (iii) should it develop internally or procure it from outside the firm? etc. Topics covered include: Three approaches to corporate strategy (Aaptive behaviour and strategy, strategy for growth and diversification, generic competitive strategies). Elements of technology strategy; some strategic issues in the chemical industry; nature of innovtions in the CI. (*Chem. Eng. Prog.* 1989, March, p. 20).

Politics and Personalities in R&D

R. King, who has worked with some renowned companies and now acts as a consultant, has given an unusual account of this subject as he believes that politics can often play a crucial part in scientific R&D. He has given a graphic description of his varied experiences. Some interesting quotes from the paper are: "Spare me the facts. Just tell me, what are the politics of this assignment". "Successful R&D can be defined as the making of silk purses out of sow's ears". King was involved in the study of the Nypro disaster; he had explored the formation of an unstable heat-sensitive peroxide. He has been honest in exposing problems associated with a fair expose' of the cause of a disaster. His next example is that of a fractionator for heat-sensitive material and brings out the role of politics associated with the ideas of the "boss" of the division. Lastly he says that the catarole cracking process owed more to politics (the Weizman patents) and the strong and charming personality of Dr. Kind than to proper R&D. (*Chem. Ind.* 1989, 15 May, p. 307).

Research and the Chemical Industry (CI): Where do we get our new ideas

W.J.D. Tollett has given an interesting account of this subject w.r.t. U.K. in particular. The worldwide production of chemicals is about 1000 billion dollars/annum; expenditure on R&D, on an average basis, may approach 4% of the turnover. CI innovation is subject to market push and technology pull. With just market pull, companies will miss the opportunities to come from science which is not yet known in the market e.g. high temperature superconductor. There is a useful role for technology scouting by extra-mural agencies. (*Speciality Chemicals* 1989, p. 146).

The invention factory

Ben Daviss has given a graphic account of The Battelle Memorial Institute which has spent 60 years figuring out how to fertilize crops, store nuclear waste, find a better car, etc. It has even constructed a computer-controlled robotic mannequin that is so human-like that it even sweats. This robot will be used to test protective clothing in simulated conditions that are hazardous for humans. The story of xeroxing is well known. Currently Battelle is working in many areas. In biological and chemical sciences it has developed the molecular beam inlet device which makes spectrometers more versatile. In biotechnology a new membrane technology has been developed which will minimize fouling. Battelle now has a design of a car which will take four passengers and allow 1 gallon to cover 85 miles in a city and a diesel version which will log 100 to 105 miles per gallon. However, interest in commercially exploiting this idea does not seem to exist right now. (*Chemtech* 1989, May, p. 284).

Another article in May 1989 issue of *Chemtech*, p. 279, refers to Vision-Innovation by W. Copulsky, who had worked for several years for one of the great commercial innovators in the chemical industry, Bradley Dewey, Sr. Dewey had worked on packaging with film to prevent deterioration of food. He was associated with Dow's Saran packing. Hewlett (of H-Packard) was developer of a pocket calculator. The visionary operates by feel and depends on his experience and is not afraid of failures. Experience comes first, thinking and theory later. Kettering's remarks are apt. "Beware of logic; it is an organised way of going wrong with confidence".

Cultivating the innovative process

R.J. Glover has given a very useful and interesting treatise. There is quote in the beginning "while management demands consensus, control, certainty, and the status quo, creativity thrives on the opposite-instinct, uncertainty, freedom and iconoclasm". It would be reasonable to say that management and creativity are antithetical. Recognition and reward systems are important. Even failures be rewarded! Let innovation be the journey and not the destination; the by-product will be financial success for the company. (*Chemtech*. 1989, April, p. 221).

Condensation of mixed vapours of hydrocarbons and water in a shell and tube condenser

Condensation of vapours resulting in two-immiscible liquids is commonly encountered in practice and here the heat transfer coefficient is radically different from that for condensation of vapours where only one liquid is formed. Kim and Webb have made a systematic study for the first time in a shell and tube condenser. The film model gives a good description of the operation. It is likely that under conditions of rather low temperature driving forces only one component condenses. (*Chem. Eng. Res. Des.* 1989, **67,** 87).

"Pellet" reactor for recovery of heavy metals from aqueous waste streams

Heavy metalas like Ni, present at levels of 10-100,000 ppm can be recovered to the extent of 99%. The reactor consists of a cylindrical vessel, partially filled with a suitable seed material such as filter sand. A 60 cm dia. reactor can treat 1200 litres/hour of water containing 1 g/ of Ni; the metal crystallises as carbonate. (*Process Engg* 1989, April, p. 25).

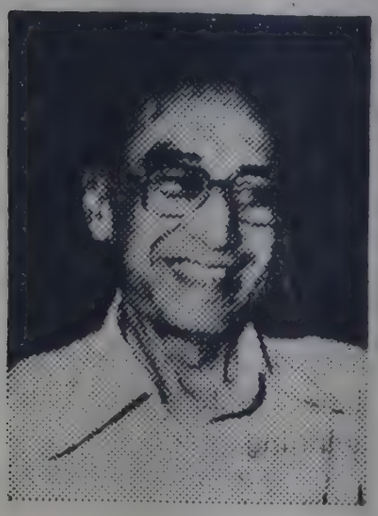
Extruder halogenation of butyl rubber

Kowalski (of Exxon) has given some details of a process under development where halogenation of buty rubber is done in an extruder. Butyl rubber has 2% isoprene moiety and this is the target molecule for halogenation and 90-99% or more of isoprene must be halogenated to get acceptable grade. The melt has a viscosity in the range of 100 million cp. There are several intricate engineering problems and this paper gives som relevant details. (*Chem. Eng. Prog.* 1989, **85,** May, p. 67)

Spontaneous separation of enantiomeric component in synthetic bilayer membranes.

Ymada **et al** have shown that enantiomeric componen in bilayer membranes of chiral ammonium amphiphil which contain the azobenzene unit separate spontaneously from each other. This is quite remarkable. (*Chem Lett.* 1989, p. 205).

IN FOND REMEMBRANCE



Shri Haribhai Patel

Chairman: **Transpek Industry Ltd.**

Expired on 25.8.88

अद्वेष्टा सर्वभूतानां मैत्रः करुण एव च।
निर्ममो निरहङ्कारः समदुःखसुखः क्षमी॥

"Without hatred towards anyone, friendly and compassionate, without attachment and ego, balanced in pain and pleasure and forgiving."

Shri Haribhai Patel had these divine traits and directed his life in accordance with the spirit of the Bhagvad-Geeta. He led a simple life which was devoted to the service of industry and society without any self-interest.

Deeply mourned by the Directors and Staff of Rasendra Chemexport Pvt. Ltd., Bombay.

FICCI calls for abolition of turnover t

The Federation of Indian Chambers of Commerce and Industry (FICCI) has called for abolition of turnover tax, which has been imposed by many states including Karnataka, West Bengal, Maharashtra and Gujarat. Being a multi-point tax, it cannot be recovered from consumers and therefore, would adversely affect the economic viability of trade, FICCI has pointed out.

Issues concerning trade, including sales tax, turnover tax, consignment tax, octroi, entry tax, the Essential Commodities Act, and the Prevention of Food Adulteration Act, will be examined at a regional trade conference of FICCI to be held at Bangalore. To be inaugurated by Mr. P. Venkatasubbaiah, governor of Karnataka, the conference will be attended by a large number of traders from the southern region.

The conference will discuss trade and consumer protection legislations. FICCI feels that the Essential Commodities Act and the Essential Commodities Special Provisions Act have lost their relevance today mainly because the emphasis of these legislations has been on regulating distribution, relegating, and more important objective of expanding supplies to the background.

FICCI also points out that there are serious flaws in the PFA act and the rules framed thereunder and in the implementation strategy. Since substandard products are not defined separately from adulterated products, there is room for arbitrariness. It is mainly due to the absence of standard methods of sampling and laboratory facilities. Regarding implementation of standards of weights and measures (packaged commodities) rules, FICCI feels that multiple challan should not be levied for the same commodity sold in the same package at different retail outlets. Traders should not be held responsible for any shortage or deficiencies in the case of packaged items sold in the original forms supplied by manufacturers.

DUTY EXEMPTION SCHEME

The guarantee period under the I Exemption Scheme by a bank has reduced from five years to three y

A release from the office of the C Controller of Imports and Exports para 10 in Appendix XIX-F inden cum guarantee bond form of e obligations to be executed under Exemption Scheme and in Appe XIX-H-indemnity cum guarantee form of export obligations to be cuted by the intermediate manufa under Duty Exemption Scheme ag intermediate advance licences has modified to read as follows:

"This guarantee by the guar bank hereunder shall remain in for ....(for a period of three years fro date of the execution of the bond if no claim is made by the Gover within the said date, the guarantor will be discharged of all the liab of payment under this guarantee further agreed that in the event of obligations of this importer beir duly discharged to the full and fin isfaction of the Government b aforesaid date, the guarantor bar the importer shall either renew revive the validity of the guaran a further period as may be requi the Government or the guarantor shall pay at any time prior to the of the indemnity-cum-guarantee without any demur, the amount s be demanded by the Governme

NALCO CHEM. HAS NEW

Nalco Chemicals India Ltd. (N a joint venture company of Chemical Company of USA a India Ltd., which is setting up at Rishra to produce speciality cals, now has a new managing d Mr. J.M. Madole. A senior man the international division of USA, Mr. Madole replaces Mr. Branon.

vironment clearance for NALCO project

e alumina project being set up by nal Aluminium Company Ltd. LCO) at Damanjodi in Orissa has accorded clearance by the Minis- f Environment and Forests. The ance is subject to certain standard specific conditions. Non- ementation of the stipulated con- ns under the Water (Prevention and rol of Pollution) Act, 1974, the Air ention and Control of Pollution) 981, and the Environment (Protec- Act 1986, may lead to the revo- n of the clearance.

e Ministry may take the same step nsatisfactory implementation of any itions, according to official sour- While NALCO has to strictly re to the stipulations laid down by e State Government and the State ution Control Board, it will not ease the throughput capacity of the t without the permission of the istry. Besides, the type of raw rial for the alumina plant also ld not be changed.

he project authorities will have to cle the liquid effluents to the max- n extent possible either as process r or for afforestation. Moreover, the d effluents discharged from the plex must conform to the standards cribed by the Pollution Control ds at the Centre and the State. For the project authorities should pro- continuous monitoring facilities.

case the effluent level exceeded the dard prescribed at any time, the contributing to the excessive pol- t loads will have to be stopped operation and remain shut until the g units are rectified. For control of ollution, gaseous emissions of sul- dioxide, oxides of nitrogen and ocarbons from the alumina plant t not at any time exceed the max- n prescribed limit stipulated by the tre and the State.

he Ministry has noted that in event of failure of any of the control systems adopted by the unit, that particular section of the plant should be put out of operation and not restarted until the control systems are rectified to achieve the desired level of efficiency. For this purpose, the project authorities must set up a minimum of four air-quality-monitoring stations in consultation with the State Pollution Control Boards at different locations of the plant and in nearby areas. This should be done after detailed modelling exercises.

The NALCO authorities will also have to evaluate the efficiency of sulphur dioxide absorbtion by alumina and the recommendations sent to the Environment Ministry for review. NALCO has also been told that all the stacks of the plant must be provided with automatic monitoring equipment. The data so monitored should be recorded and submitted to the State Pollution Control Board once every quarter and half-yearly to the Union Ministry.

Moreover, design of stacks should not be changed without the prior approval of the board. the performance of the electrostatic precipitators installed in the plant must be reported to the Ministry once in three months. The red mud from which bauxite has been extracted must be utilised by the project authorities for brick making and pozzolena cement. A disaster management plan duly approved by the nodal agency has to be submitted to the ministry within a period of six months.

As for the afforestation plan, the project authorities will have to develop a green belt of 660 hectares which is not to be used for any other activity. The tree plantation in the green belt should be at the rate of 1,000 trees per acre. Additional areas under the control of the company which is not being used for plant utilities must also be afforested with adequate density. A full-fledged laboratory with facilities for collection and analysis of samples and a separate environmental management cell with suitably qualified personnel to carry out various functions related to environmental management should be set up.

NALCO has been told that adequate funds must be made available for implementation of these conditions and the finances provided for this purpose should not be diverted for any other activity. NALCO's plant at Damanjodi comprises an alumina refinery with a capacity of eight lakh tonnes per annum.

It has been set up in two phases. Stream-I of the plant started commercial output of hydrate and calcined alumina on a continuous basis from October 1987. Work on Stream-II has also been completed and trial production started from June last year.

SERENE DYESTUFF FARES WELL

Serene Dyestuff Industries Ltd. has reported encouraging results for the nine-month period ended March 31, 1989. Sales and other income rose to Rs. 563.44 lakhs as compared to Rs. 254.67 lakhs for the full 12 month-period ended June 30, 1988.

Gross profit went up to Rs. 27.96 lakhs for the nine-month period as compared to Rs. 5.86 lakhs for the previous full year. After providing Rs. 21.67 lakhs for depreciation, the profit before investment allowance reserve is Rs. 6.26 lakhs.

Serene's new project commenced production in August 1988 and achieved a capacity utilisation of 72 per cent in a seven-month period. The company has expanded its range to include high-value added products and the outlook for the future is promising, says a press release.

The Company has made a cash profit of Rs. 27.96 lakhs and an operating profit of Rs. 6.28 lakhs for the first year of production of its new project at Chiplun in Maharashtra.

Indo-British workshops on heat pumps and energy conservation

Heat pumps, a unique heat recovery device, can be used to recycle energy in chemical and process industries. In industrially developed countries, many heat pumps of both types, mechanical and absorption, in sizes ranging from kW to MW, are being used resulting in significant energy conservation.

Recognising the enormous potential for heat pumps in India, NCL has made pioneering efforts in this area since 1980 through an international collaboration with the University of Salford, U.K. sponsored by the Overseas Development Administration (UK) and administered by the British Council Division, Bombay. As a part of the programme, NCL has been conducting workshops to enhance the awareness in India on the potential for heat pumps and energy conservation. The aim of these workshops is to give the participants a realistic appreciation of the availability of international heat pump technology and its relevance to India.

The workshop will be held on November 20 at New Delhi and from November 23-25 at Pune. Experts from U.K., Mexico and from NCL will lecture on the various aspects of heat pumps and energy conservation.

The workshop at NCL will include demonstrations of various heat pump units including a water-to-water pump, a heat pump assisted dryer, a heat pump assisted distillation column and absorption systems. Four short courses held earlier at NCL have generated significant industrial interest towards heat pump technology and heat recovery.

All the registered participants will have an opportunity to have discussions with a panel which will include the faculty and specially invited officials from energy related government agencies. The venue for the workshop at Delhi will be announced shortly. The venue of the workshop at Pune will be the National Chemical Laboratory.

The workshop at NCL will include the following lectures. Some of these lectures will be presented in a condensed form in the workshop at Delhi.

Heat Pump Fundamentals, Sorption Heating & Cooling — Part I, Heat Pump Compressors, Preliminary Design of Heat Pumps, Organic Rankine Power Cycles, Heat Pump Assisted Evaporation, Sorption Heating and Cooling Part II, Field Experience with Absorption Cooling Systems, Industrial Energy Management — Part I, Heat Pump Assisted Drying, Economics of Heat Pump Applications, Industrial Energy Management — Part II, Potential for Heat Pumps in India, Heat Exchanger Networks and Heat Pumps.

For further details contact: Dr. S. Devotta, Chemical Engineering Division, National Chemical Laboratory, Pune-411 008. Telex: 0145-266/586/653 NCL, Fax: 0212-330233, Phone: 333941, Gram: "CHEMISTRY", Pune 411 008.

SYMPOSIUM ON BIOLOGICAL PROCESSING OF COAL

The U.S. Department of Energy's Pittsburgh Energy Technology Center is seeking papers for the first International Symposium on the Biological Processing of Coal scheduled for May 1-3, 1990, at the Hyatt Orlando Hotel in Orlando, Florida.

The symposium, jointly sponsored by DOE and the Electric Power Research Institute, will promote interest in this emerging area of coal research and identify new technologies. Biological processing is the use of naturally occurring microorganisms to clean or convert coal. Those interested in preparing a paper for consideration must first submit a 200-400 word synopsis, includi name, title, business address, and tel phone number no later than October 1 1989.

Papers should be classified in one four categories: (1) coal structure a bioreactivity; (2) coal analysis; (3) c biosolubilisation, biogasification a biobeneficiation (including deashir desulphurisation, denitrification, a bio-assisted flotation); and (4) bioc version of coal-derived substanc (including bioconversion of synthe gas and coal combustion gases, and b processing of tars and sludges).

Synopses should be sent to: Dr. K. Rhee, U.S. Department of Ener Pittsburgh Energy Technology Cen P.O. Box 10940, M.S. 141/L, Pi burgh, PA 15236. U.S.A. Telepho 412/892-5913.

WHO CONFERENCE ON OCCUPATIONAL HEALTH

The World Health Organisation h announced details of its first *Europ Symposium on Occupational Health the 1990's under the theme "Time a New Approach"* to be held at the R Congress Centre, Amsterdam, fr 13-16, March 1990.

The symposium will review:

* Education and training needs in oc pational health,
* The supply, distribution and educa of the occupational health team p fessionals,
* Preventable issues and emerg trends in occupational health in 1990's.

For those concerned with occu tional health this symposium is a m

Further details are available fr Occupational Health for the 199 Symposium Secretariat, CEP Con tants Ltd., 26-28 Albany Street, E burgh, EH11 3QH. Tel.: 031 557 2 Fax: 031 557 5749.

Seminar on Pollution Control in Metallurgical Industries

two day seminar on Pollution and Control in Metallurgical and Metal shing Industries was held on 11th 12th August 1989 at AIEMA Tech-gy Centre, Ambattur Industrial te, Ambattur, Madras. The seminar organised by the society for vancement of Electrochemical ence and Technology, Madras pter and Central Electrochemical earch Institute, Karaikudi.

he seminar provided a forum for an hange of knowledge on the state of art of the subject, the experiences the impediments in implementing pollution control measures. During seminar, invited papers were presen-on the control measures adopted on ution in metallurgical and metal fin-g industries, the handicaps of the stries in effecting rigorously the ution control regulations, and the nt developments.

bout 50 delegates participated. They uded personnel from industry, D institutions and pollution control ncies. Shri F.J. Vaz, I.A.S., Chair-and Managing Director, Tamilnadu ll Industries Development Corpo-n Limited, inaugurated the seminar Prof. S.K. Rangarajan, Director, tral Electrochemical Research Insti-, Karaikudi, presided. In the con-ling session, an open house ussion was arranged to enable the gates participating from various inisations to present a brief on their eriences in the respective industries.

NFERENCE ON ENVIRON-NTAL CONTAMINATION

he fourth conference in this success-biennial series covering environ-tal contamination of air, soil and er will be held in Barcelona from October 1990. Themes for the 1990 ference are:

tmospheric environmental impact — increase of ozone, CO_2, UVB-radiation
* Contaminated land
* Utilisation of sewage sludge
* Toxic wastes
* Pollutants in continental water systems and their transport to the sea
* Artificial radioactivity in the environment
* Long term pollution and evolution
* Health effects
* Biomonitoring
* Waste treatment processes
* Environmental analytical chemistry

Deadline for submission of 300-word abstracts is 9th March 1990.

Further details from: Environmental Contamination Secretariat, CEP Consultants Ltd., 26-28 Albany Street, Edinburgh EH1 3QH. Tel.: 031 557 2478, Fax: 031 557 5749.

FOURTH INTERNATIONAL SYMPOSIUM ON QUANTITATIVE LUMINESCENCE SPECTROMETRY IN BIOMEDICAL SCIENCES

State University of Ghent, Faculty of Pharmaceutical Sciences, Harelbekestraat 72, B-9000 Ghent (BELGIUM), Tel. 32-(0)91-21.89.51 ext. 254, Telefax 32-(0)91-21.79.02 is organising the Fourth International Symposium on Quantitative Luminiscence Spectrometry in Biomedical Sciences between May 27-31, 1991.

Details can be had from Dr. Willy R.G. Baeyens, Symposium Chairman, State University of Ghent, Pharmaceutical Institute, Harelbekestraat 72, B-9000 Ghent (Belgium).

NEW MANAGING DIRECTOR FOR LPA

Mr. N. Balaraman has taken over as the Managing Director of Loss Prevention Association of India Ltd., Bombay on 1st August, 1989. Prior to joining LPA, Mr. Balaraman was General Manager of General Insurance Corporation of India.

NRI TO BUY FOREIGN STAKE IN SHALIMAR PAINTS

The non-resident Indian group, headed by Mr. S.S. Jhunjhunwala, will acquire, subject to Reserve Bank of India approval, 40 per cent equity shareholding in Shalimar Paints Ltd. held by Courtaulds Coatings Ltd. formerly known as International Paints, Plc. Ltd. UK.

The Jhunjhunwala group has been based in Hong Kong for over 35 years and is involved in watch manufacture, real estate, investment and financial services. The group also operates a ferro-silicon manufacturing unit.

Meanwhile, the local shareholding of the Mehta family in Shalimar Paints (about 20 per cent), it is learnt, is to be sold to the Jindal group in India. As Jhunjhunwala and Jindal families are related, it has been proposed to operate Shalimar Paints as a joint venture of the Jindal-Jhunjhunwala group.

The Jhunjhunwala and Jindal groups have given an assurance that the present management will remain under the leadership of the managing director, Mr. V.K. Bhalla. The new partners of Shalimar Paints have plans for expansion, modernisation and diversification of the company's operations.

C.N.R. RAO HONOURED

The Prime Minister, Mr. Rajiv Gandhi, presented a scroll of honour to Prof. C.N.R. Rao, chairman, Science Advisory Council, for his outstanding contribution to research.

The scroll has been instituted by the Gujarmal Modi Science Foundation.

NRDC awards for ten inventions announced

The National Research Development Corporation (NRDC) has announced its 1989 Independence Day awards for ten innovative inventions under its invention promotion programme. The cash awards for the ten inventions amount to a total of Rs. 2.8 lakhs.

The prize award committee recognised developments in key areas of national importance, such as development of "space qualified multicavity interference filters", "respiratory flow meter" to record both peak expiratory and inspiratory flows, "an improved type of cell for production of magnesium metal by fused chloride electrolysis' reducing energy consumption, "durable blood analysis equipment".

* Dr. V.V. Shah, Dr. B.S. Verma, Dr. R. Bhattacharya, Dr.(Mrs.) M. Kar and Mr. T.K. Battacharyya of the National Physical Laboratory, New Delhi, have been jointly awarded a sum of Rs. 50,000 for developing the space qualified multicavity interference filters for the infra-red band of smart sensor (payload of Rohini Satellite-D2). These filters provide a large bandwidth with low back-ground transmission showing steep rise and fall with nearly flat top transmission characteristics.

* Dr. Virendra Singh of Jaipur has been awarded a sum of Rs. 50,000 for the development of a respiratory flow meter which records peak expiratory flow rate (PEFR) alongwith peak inspiratory flow (PIF). The novelty of the device is that one end of it can be used for mouth piece attachment and both PEFR and PIF can be recorded, making the operation quite easy and less time-consuming. The device is useful for monitoring severity of asthma, response to bronchodilators and a provides information about the emp sema lung disease.

* Mr. P.S. Desikan, K.S. Srinivas A. Selvakesavan, G.N. Kannan, S Sukumaran, L.K. Srinivasan, P. Sub manian, C.O. Augustin, T. Selvin De sahayam, N. Rajagopalan, K.S. Dan pani and S. Srikantan of the Cen Electrochemical Research Institute, raikudi, have been jointly awarde sum of Rs. 5,000 for the design development of an improved (modu cell for production of magnesium m by electrolysis from sea-bittern magnesite. This modular concept of will save about 40% of electrical ene in comparison to conventional cel

* Mr. Raghbir Singh Khandpur, Ashok Kumar Bhandari and Mr. Sa Singh Randhawa of the Central Sc tific Instruments Organisation, Cha garh, have been jointly awarded a of Rs. 30,000 for the developmen blood analysis equipment for analy various blood parameters like gluc urea, albumin, proteins etc.

* Dr. V.B. Singh, Dr. K.G.K. M thy, Mr. P.K. Kaushik, Mr. San Subramanian of Shri Ram Fibres I Madras and Mr. J.K. Khanna, Dr. Jayaraman, Dr. K.V. Raghavan, D.H. Kamath, Mr. S. Ramalingam Dr. G. Thyagarajan of the Central ther Research Institute, Madras been jointly awarded Rs. 20,000 fo development of "tuftan", a leather mical, based on polyamide resin, w fixes more chrome on leather in the ning process and therefore consider reduces chrome going in the effl imparts intense and uniform dyeing improves overall properties of lea

Mr. K. Mallikarjunappa, Mr. N Ratra and Mr. S.N. Moorching of Central Power Research Institute, B galore have been jointly awarded a of Rs. 15,000 for developing the healing break down detector for pc capacitors.

IOC plans Rs. 1,466-crore oil refinery in Orissa

he Indian Oil Corpn. (IOC) has pro-ed a six-million tonne refinery based imported crude oil to be set up at tari in Orissa to meet the increasing nand for petroleum products in the tern region. According to the feasibi- report submitted by IOC to the Pet-eum Ministry, based on the May 89 prices, the refinery will cost Rs. 66.50 crores, including a foreign ex-nge component of Rs. 222.10 crores. The feasibility report has also pro-ed a 928-km pipeline estimated to t Rs. 561.87 with a foreign exchange nponent of Rs. 96.06 crores. The inery will be completed within 48 nths of approval of the detailed fea-ility report by the Centre.

Daitari has been selected as the site the proposed refinery because of eral advantages offered by it. These lude proximity to the highway, rail and water resources, barren land h no habitation around the site and imal site preparation requirement. e site is also away from the cyclonic a at Paradeep.

The Paradeep port is already a devel-d port with sufficient draft and tide hout any congestion. The refinery l have a hydrocracker of 1.6 million nes capacity and fluid catalytic cker of 0.65 million tonnes capacity. e refinery will be designed to process de oil falling in Api range of 27 to degree and a sulphur content of upto per cent to maximise production of ddle distillates.

The debt equity ratio of the refinery been assumed at 1:1 and the eco-nic rate of return at 16 per cent. The eline will have two sections. The ported crude oil received at the Para-p oil terminal will be pumped ough a 100 km pipeline to the Dait- refinery. The pipeline will have a hodic protection and telecommuni-ion and telesupervisory controls.

The total cost of these facilities will Rs. 145.29 crores with a foreign change component of Rs. 32.26 crores. The second section of the pipe-line will carry products from Daitari to Allahabad traversing through Orissa, Bihar and Uttar Pradesh. It will have four intermediate pump stations at Ken-dujhgarh, Rourkela, Ranchi and Chan-dani with terminal facilities at Allahabad. It is proposed to provide tap points at Rourkela and Ranchi and despatch facilities at Rourkela, Ranchi and Allahabad. The capacity of this pro-duct pipeline will be three million inclu-sive of marketing facilities. It is estimated to cost Rs. 416.58 crores with a foreign exchange component of Rs. 63.80 crores.

MORE EXCHANGE FOR CRUDE OIL IMPORT SOUGHT

The Petroleum Ministry is moving the cabinet for higher allocation of for-eign exchange for import of crude oil and petroleum products during the cur-rent financial year. This follows the Finance ministry's attempts to curb imports of these items in view of the tight foreign exchange position and the high rate of consumption observed in regard to certain products.

The Petroleum Ministry has found that if the imports are to be restricted to the levels suggested by the finance ministry, severe curbs will have to be introduced on consumption of motor spirit and diesel oil. During the first quarter of the current financial year, the consumption of motor spirit went up by 13.9%. This will have to be brought down to 1.4% between July-March 1989-90, if the Finance Ministry's instructions are to be followed.

Similarly, in case of diesel oil, the consumption rate between July-March 1989-90 will have to be brought down to 4.3% against 10.8% during April-June 1989-90. Bringing the consump-tion of motor spirit and diesel oil down to such levels is not considered possi-ble by the Petroleum Ministry for sev-eral reasons.

Gas grids in Gujarat to be integrated

Oil and Natural Gas Commission (ONGC) is intensifying its activities in the western region by adopting various advanced production techniques — early production system, work-over operations, well stimulation etc.

Oil production in the region would increase from 6.21 million tonnes in 1989-90 to 9.02 million tonnes in 1994-95 and gas production would touch approximately 14 billion cubic metres in 1994-95 from the present level of one billion cubic metres. The main contribution to oil production is expected from the Gandhar belt, Balol, Lanwa etc.

Disclosing this an ONGC spokesman said that the LPG production will also go up to 60,000 tonnes per annum from Gandhar and 45,000 tonnes from Ankleshwar. Presently, ONGC produces approximately 4.5 million cubic metres of gas per day and major increase would come from Gandhar. The gas grids of north and south Gujarat are proposed to be integrated.

It is planned to install five compressors, out of which, one each would be set up at Kalol, Nawagam and Sanand to increase utilisation of gas. One LPG plant will be established in Gandhar to supply bottled domestic fuel to consumers.

The total area of the Cambay basin is approximately 45,000 sq. km. Till date, semi-detailed geological mapping of 60,000 sq. km. has been completed. Twelve departmental and three contract parties are engaged in conducting seismic surveys from the basins.

For the first time, 3-D data acquisition in Balol area was started under UNDP during 1985-86. Various geoscientific data collected have helped in identifying 186 prospects where drilling has been undertaken.

Till March 31st this year, 2205 wells have been drilled of which 1377 were oil bearing and 127 gas bearing. Many of the wells are either under testing or fully tested. Today, there are 38 rigs operating in various parts of Gujarat

The spokesman said the annual Plan 1989-90 envisages drilling of 313 wells in the State which includes the contract drilling also. Starting from a meagre quantity of 100 tonnes of oil per day in September 1961 at Ankleshwar, oil production of western region has gone up to 16,500 tonnes per day.

Similarly, gas production has also been stepped up from 0.14 million cubic metres in 1964 to about 4.5 million cubic metres per day. At present, oil from major fields is transported through 557 km trunk pipelines to Gujarat refinery, Baroda. The gas is providing basic feed stock to chemicals, power, textiles, pharmaceuticals etc.

The spokesman said an investment of Rs. 1,630 crores up to March 31, has boosted the State's economy. Since inception ONGC has paid Rs. 664.28 crores as royalty, Rs. 269.5 crores as sales tax to the State Government. Besides, a cess of Rs. 1,830.63 crores has been paid to the Union Government.

Substantial financial assistance has been made for construction of footbridge, street lights, repair of roads, maintenance of gas pipelines, maintenance of schools, construction of busstands, sewage disposal etc.

OIL STRUCK IN JALGAON

Oil has been struck in Jalgaon in north Maharashtra according to information received from the Oil and Natural Gas Commission (ONGC) by the State Government, Chief Minister Sharad Pawar announced in the legislative assembly on August 10.

Oil and Natural Gas Commission had asked permission to start drilling 450 hectare area where the oil de was located. The Government granted permission and drilling expected to commence after the r soon.

Mr. Pawar said the exact extent o oil deposit in the area was not kn immediately. ONGC wanted to un take drilling without much delay permission was granted promptly b Government. The Chief Minis announcement was greeted by thu ing of desks by the members in House.

SHORTAGE OF ALUMINIUM UNLIKELY

The gap between demand and availability of major non-ferrous m like copper, zinc and lead is exp to remain as wide as ever. No int shortage of aluminium is, how expected and Bharat Aluminium C pany (BALCO) has, in fact, entered an MoU with MMTC to export its ducts.

The latest official estimates show the demand for copper and zin 1989-90 will more or less remain a same levels as last year. The demar copper is estimated at 135,000 to only 41 per cent of it would be m indigenous production. The demar zinc is expected at 155,000 tonn

The indigenous availability of z expected to marginally improve fro per cent last year to 55 per cent year. Local production of lea expected to pick up but even it c meet only 62 per cent of demand mated at 65,000 tonnes in 1989-90 gap between demand and supp being met through imports whic canalised.

BALCO expects to export crores this year against Rs. 1.1 cror year.

& D EFFORTS IN PETROLEUM SECTOR

Rs. 1309 crore outlay in Eighth Plan suggested

An outlay of Rs. 1,309 for research l development in the petroleum tor has been suggested by a Planning mmission sub-group for the Eighth e Year Plan. This includes Rs. 935 res for exploration and production, . 358 crores for refining and Rs. 16 res for conversion. The sub-group suggested that research and develnent efforts in the petroleum sector he Eighth Plan should include areas underground coal gassification, earch wells, development of alterna- sources of energy, technologies for t reduction, and improving additive tems.

Some of the thrust areas identified by sub-group for petroleum refining are velopment of a new catalyst for cking and reforming, adoptation and igenisation of distillate hydrocrack- of residues for bottoms upgradation l technology development for proction of quality bitumen from Indian des. Attention should also be paid to nversion of natural gas into middle tillates, development of suitable hnology for absorptive and memne separation of light gases, proved additive systems for lubriits and fuels and development of high formance lubricants.

In the area of oil exploration and proction, the sub-group has suggested t efforts should be concentrated on velopment of new techniques for ecting surface hydrocarbon explora-n, development of techniques for mbating the drilling problems arising t of hostile environments in deep and ra-deep wells, dimensional data quisition, hydrocarbon generation and odelling.

Research and development efforts are o required for deep sea production stems and their techno-economic aluation, corrosion protection and its efficacy, particularly in offshore structures, and indigenisation of oilfield equipment and chemicals. In the field of oil conservation, the sub-group has suggested development of efficient gas burners, fuel-efficient kerosene appliances, and efficient aluminium malting furnaces for small-scale sector should be taken up. Efforts should also be made for development of efficient diesel engines for water pumpsets, ceramic heat wheel, recycling of used lubricants and solar thermal energy projects.

HANDLING OF OFFSHORE GAS: GOVERNMENT TURNS DOWN PROPOSAL FOR SECOND TERMINAL

The central government has turned down a proposal for setting up a second terminal in Maharashtra to handle offshore gas. The proposal for setting up such a terminal was made by both the Maharashtra government and the Oil and Natural Gas Commission (ONGC). The Maharashtra government had proposed a second terminal to provide an impetus to gas-based power, sponge iron, fertiliser, and chemical units in the state. The ONGC had made the second terminal in Maharashtra a part of its original western offshore integrated development plan.

The matter was referred by the Central Government to an expert group for examination. In its report submitted to the government, the group has said that there was no need for such a terminal for the time being. At present there are two terminals for handling offshore gas. One is at Uran in Maharashtra and the other at Hazira in Gujarat. The Uran terminal can handle about 12.5 million cubic metres of gas per day. This capacity will go up to 14.5 million cubic metres per day after the completion of Hazira-Uran pipeline next year. The total commitment for various consumers in Maharashtra is 16 million cubic metres of gas per day. The second terminal at Hazira can handle 20 million cubic metres of gas per day. While five million cubic metres is used by consumers at Hazira itself, the rest is intended to be utilised by various consumers along the Hazira-Bijaipur-Jagdishpur (HBJ) gas pipeline.

The Central government is, however, exploring the possibility of setting up a third terminal for handling offshore gas at Pipavav on the Saurashtra coast. This is being explored in the context of setting up of a power plant at Pipavav by bringing the gas from the Tapti fields in the western offshore region. It has been estimated that about three million cubic metres of gas per day can be brought from the Tapti fields to Pipavav.

The government is also examining the possibility of providing facilities for import of liquefied petroleum gas (LPG) at Kandla to handle four lakh cubic metres of gas per annum. The Indian Oil Corporation (IOC), Bharat Petroleum Corporation Limited (BPCL) and Hindustan Petroleum Corporation (HPCL) are also thinking of enhancing their capacity to handle the import of LPG. While IOC is examining the feasibility of using ONGC's single buoy mooring system under construction at Hazira, BPCL and HPCL are thinking of augmenting import facilities at Bombay and Vizag to meet the growing demand for LPG in the country.

MP REFINERY

The Union Government has taken a decision that Bharat Petroleum will set up a six million tonne refinery at a cost of Rs. 2,500 crores in Madhya Pradesh. This information was given by the Madhya Pradesh Chief Minister, Mr. Motilal Vora, at N. Delhi after a meeting with Mr. R.K. Gajari, Chairman of Bharat Petroleum. According to an official release, proposals for first stage clearance of the project are currently being processed.

Secretaries panel okays ONGC production plan

The committee of secretaries has approved the dynamic production plan (DPP) of the Oil and Natural Gas Commission (ONGC) which seeks to raise oil production from west coast offshore areas from 21.6 million tonnes slated for the terminal year of the current Plan to 30 million tonnes annually by the end of the next Plan.

According to Mr. H.K. Khan, Secretary in the Ministry of Petroleum and Natural Gas, DPP, which will be given a final shape by the committee shortly, provides for innovative approach to the development of the field.

It seeks to focus on the development of the entire area rather than on an isolated project. Development of infrastructure for the whole area and integration of various schemes will be attempted under this plan.

The concept of DPP has been evolved in light of the fact that the present system of applying parameters of evaluation of engineering industry to oil and gas projects does not result in the optimum use of resources in the latter case. It is felt that parameters cannot be frozen in the development of oil-related facilities as in the case of an engineering project.

Experience shows that in many cases, exploration and exploitation are concurrent calling for mid-course changes for optimisation with new data resulting in upgradation of reserves or flow rate.

For example, the geological reserves of Bombay offshore have undergone changes with time. The reserves that were estimated at 512 million tonnes in 1975, moved up to 1850 million tonnes in 1985 and as per the latest estimates now stand at 2,286 million tonnes.

Apart from aiming to hit a production target of 30 million tonnes of oil by the end of the next Plan, DPP seeks corresponding growth in reserve accretion, LPG production, rig deployment numbers and platform numbers. The Plan, in Government circles, is considered ambitious but technically feasible with suitable policy initiatives.

The production outlook, projected by DPP, is based on reserves already established. Prospects of addition to these reserves are considered bright in official circles in view of a large part of prognostic resource base yet to be converted to geological reserves.

All the proposals under DPP will be considered as one basket for all Government sanctions. Oil and Natural Gas Commission is expected to meet the targets fixed for the field while working within a given framework of total outlays, time schedules and unit cost per barrel of oil.

In addition to increase in oil production, gas output from the western offshore is also going to rise significantly. As against an expected production level of 25 million cubic metres of gas per day during 1989-90, the production (including free and associated gas) is expected to be around 48-49 million cubic metres per day by the terminal year of the next Plan. The new fields such as mid and south Tapti, S-1 of Bombay High, B-55 and South Bassein gas field would contribute to this production.

Twentyfive new discoveries have been made in the western offshore since 1980, comprising 13 oil, 6 oil and gas and 6 gas discoveries.

The latest state-of-art technologies such as sub-sea completion, multiple well completion and horizontal drilling which were introduced successfully during the Seventh Plan would be used on a wider scale in the next Plan.

ONGC GROUP GATHERING STATION AT NARIMANAM

Oil & Natural Gas Commiss (ONGC) has completed construction its first group gathering station for and gas handling at Narimanam, T jore. The facilities, designed for 1 cubic metres per day of oil and its ass iated gas, have been put to trial use loading of oil into road tankers fr there has also commenced. The N mianam structure now produces o 500 metric tonnes of oil and assocla gas a day. The facilities at the gro gathering station include flow lines, and gas separators, storage tanks road tanker loading system.

MITCO BAGS EXPORT ORDE WORTH Rs. 4.5 CRORES

The Mica Trading Corporation India (MITCO) has bagged orders export of mica based products wo over Rs. 4.5 crores to several fore countries including the Soviet Uni Japan, South Korea and Singapore. I stipulated for supply during the curr financial year, MITCO sources sai

A MITCO delegation led by chairman-cum-managing director, v ited the USSR recently and secure contract for Rs. 3 crores for supply mica based products before Novem this year.

The MITCO also clinched an or for supply of 126 tonnes of mica pa to Japan valued at Rs. 77.6 lakhs. So Korea, the sources said, had plac orders for supply of 75 tonnes of m paper per month and samples h already been sent to them for evaluati

A protocol had been signed with S gapore for sale of mica based produ and it was likely that the country wo depute a high-level team for finalis long term business with MITCO for s of mica products in Singapore a Malaysia.

EXPLORATION AND DRILLING

rlas to team up with 2 Soviet companies

rlas have proposed a joint venture the Soviets for undertaking oil oration and drilling, both onshore offshore, in India and third coun-. According to the proposal Birla neering Services will form a joint ure with two Soviet companies Zar-hneftestroy and Machinoimport.

he proposal envisages that Birla neering Services and associates will 60% equity and the two Soviet panies 40% equity. The total Soviet ty will come to Rs. 10 crores while est, Rs. 15 crores, will be raised by Birla company and its associates. e is also a proposal that Birlas may part of their share of 60% equity ugh public subscription.

he joint venture will also take up cover operations, seismic survey data processing, perforation and rologging services, cementation services and mud engineering production testing and other services relating to oilfield. The two Soviet companies will provide the proposed joint venture with access to latest technology on a continuous basis. They will also provide training to Indian personnel in the Soviet Union.

According to the proposal, the joint venture will start its initial operations by acquiring two onshore drilling rigs. These rigs, which will be capable of drilling to a depth of 5000 metres, will be offered to Oil India and ONGC in India, and clients in other countries on charter-hire basis.

It is proposed that the joint venture company will acquire technical equipment from Soviet Union on soft credit and deferred payment basis. Technical knowhow for oil field services will be provided by the two Soviet companies on mutually settled terms. The Birlas have claimed that on the basis of the present drilling plans of the Oil India and ONGC, the proposed joint venture will be able to save about Rs. 4.5 crores per year of foreign exchange in the next five to ten years since no payment will be required to be made in hard currency. The joint venture proposal is now being examined by the government.

DAVY SETS UP ACRYLIC FIBRE COMPANY IN THAILAND

Davy Powergas of Bombay has commissioned Thailand's first acrylic fibre plant for the Thai Acrylic Fibre Co. Ltd. The entire engineering details, project management and construction supervision services for the plant were provided by Davy Powergas. The engineering, procurement, construction and mechanical commissioning was completed in a record time of 22 months. The plant is based on the Japan Exlan process and the process design package was provided by KHI of Japan.

ONGC to drill more areas in Assam

The Oil and Natural Gas Commission (ONGC) will expand its exploratory activities to more areas of the Assam shelf and the Assam-Arakan fold belt i.e. the entire north-eastern region where the prognosticated hydrocarbon resources are placed at 2,000 million tonnes.

Out of this, 525 million tonnes have already been converted into geological reserve and as on January 1 this year, the region achieved a reserve accretion of 113 million tonnes (74.4 per cent) against the target of 153 million tonnes set for the Seventh Plan. According to a release from the eastern region business centre (ERBC) of ONGC at Nazira, activities in the north-eastern region have been stepped up three folds since 1980-81. The rig-count has increased to 37 from 13 rigs in 1980-81.

Production of crude oil by the ONGC in the region has progressively increased to 3.09 million tonnes. The Seventh Plan envisages a total production of 15.03 million tonnes from the region with a terminal year production of 3.1 million tonnes. The targeted production of crude oil during 1989-90 is 3.4 million tonnes.

The identified thrust areas of the ONGC in the region include the Khoraghat-Uriamghat areas in Dhansiri valley project which has been termed as highly prospective area. Other priority areas for intensive exploration activities include three dimensional surveys in Rudrasagar area, exploratory drilling at Dimapur, Bandarsulia, Sridharpur, Govindpur, Khasimara, delineation of Demulgaon, Sonari, Khoraghat, Uriamghat, Adamtilla, Banskandi and development drilling at Demulgaon and Sonari. As regards the expansion of activities to more areas, it is stated that Mizoram forming a part of the Assam-Arakan fold belt has estimated hydrocarbon resources of 173 million tonnes.

ONGC has spudded the first well in May this year at Rengte, 75 km south of Silchar and will drill to a targetted depth of 3,000 m, and has also planned to drill three more wells in Mizoram. The hydrocarbon resources of Meghalaya are placed at 100 million tonnes. The ONGC proposes to take up drilling at Khasimara structure in East Khasi Hills district at a place 60 km south east of Shillong to a depth of 2,500 metres. Till March 1989, ONGC carried out 11,028 sq. km. of geological surveys in Meghalaya.

The prognosticated resources of Manipur are of the order of 35 million tonnes. During the current year, and also in the initial period of the Eighth Plan, ONGC proposes to undertake detailed geoscientific surveys in Manipur, drilling for oil in Tripura, where large deposits of gas have already been formed, will soon commence in the Hararganj area.

Since commencement of its operations in the north-eastern region in 1950, the ONGC has identified more than 130 structures of which 50 structures have been explored so far by drilling. The south Brahmaputra valley has been a fairly well-explored area.

So far ONGC has established Lakwa-Lakhmani, Rudrasagar, Geleki, Demulgaon in Brahmaputra valley, Changpang field in Schuppen belt of Nagaland, Borholla field in Dhansiri valley, Rokhia, Baramura and Agartala gas field in Tripura and Badarpur field in Surma valley.

The ONGC has set up an ambitious target for the region for the Eighth Plan period. Crude production will increase from 3.51 million tonnes in 1990-91 to 5.11 million tonnes by 1994-95 (the terminal year of the Eighth Plan), gas production from 808 million cubic metres to 1095 million cubic metres, drilling rigs from 39 to 48, drilling meterage from 2.9 lakh metres to 3.53 lakh metres and the number of wells will go up from 86 to 117.

Besides, there is a proposal for ting up of an LPG plant with an ann capacity of 85,000 tonnes by 199 serve an additional 5,000 familie Assam. During the current year it ONGC is completing a Rs. 26-c project for installing three gas-b captive power plants at Lakwa, Ge and Rudrasagar fields for suppl power to the oilfields.

It is stated that in the eastern re the gas utilisation percentage reached over 80 per cent as a resu skilful monitoring of demand. Ti completion of downstream facilities committed offtake of gas by con ers will further improve the utilis percentage. During the last year, O supplied about 230.676 million c metres of gas to various consume Assam.

It has started supply of domesti to Sibsagar town to meet an estim daily demand of 10,000 cubic m Nazira town will be supplied an estimated 20,000 cubic metres pe soon. Meanwhile, it has agree supply 20,000 cubic metres of ga day to the Nagaland Pulp and Mills at Tuli.

IISCO TO INVEST Rs. 200 CRORES ON POLLUTION CONTROL

The Indian Iron and Steel Co (IISCO), a subsidiary of the Authority of India Limited (SAIL) to invest over Rs. 200 crores in ducing the latest pollution contro nology.

After modernisation, a prac new integrated steel plant is expe be commissioned by 1995-96 will adopt extensive dust ext system with cyclones/bag filter recycling facilities at the raw m handling yard, cast house stock of the new blast furnaces, cont casting plant, and lime plant.

N-ASSOCIATED GAS

UK firm to help OIL

Oil India Ltd. has hired a British firm help it prepare a master plan for the velopment of non-associated gas ervoirs discovered in Assam some- e ago. According to OIL sources, elldrill Ltd. of the UK has won the .30 lakh consultancy contract. The ier firms in the race were Interna- nal Petroleum Engineering Consul- its Ltd., and Robertson Erc Ltd. from UK, SSI and Improved Petroleum covery International Ltd. of the US d Total Compagnie Francaise Des troles of France.

The consultant is expected to review structural picture, determine the gas place and conduct detailed geologi- and reservoir engineering studies ing both analytical techniques and ervoir simulation. The consultant will ake alternative development plans th optimisation on well completion sign and surface facilities network.

Economic analysis will follow the va- ous development plans to arrive at a ntative optimum development plan for e non-associated gas resources. The on-associated gas reserves are spread er several areas in the oilfields. The ajor known accumulations are mostly nfined to two adjacent major oil-field eas — Nahorkatiya and Jorjan. Only small amount of this gas has till now en produced on occasional demands meet the peak market requirements. ll the non-associated gas wells which e occasionally put on production lie and around these oilfield areas.

Based on the present estimates, it is kely that once developed, these non- ssociated gas reservoirs will produce t a rate of 2.5 million standard cubic etres of gas per day. At present, there re about 12 discrete areas where nat- ral gas reservoirs have been discov- red. Most of these are located within distance of about 25 km radius from Duliajan, Assam.

The total number of existing wells aving mainly gas prospects in these reas is around 40 out of which about 25 are presently completed as gas wells. Few of the wells have oil prospects in addition to gas pay zones. The gas accumulations mainly occur in faulted miocene and oligocene sandstone reservoirs located at a depth range of 2200 metres to 3500 metres. Gas reservoirs are also located in eocene sandstone formations at a depth of about 3500 metres in one of the areas.

Recent interest in obtaining additional gas supplies in the Jorhat areas mainly for setting up a combined cycle gas-based power plant generating 360 mw of power has prompted OIL to engage the consultant from the UK to assess the reservoirs and work out a development plan for these non-associated gas reservoirs. As per the integrated gas grid in Assam worked out by Gas Authority of India Ltd. to connect OIL's fields and ONGC's eastern region fields, a trunk pipeline 132 km long from Nahorkatiya to Jorhat, with a compressor station at Nahorkatiya, may be set up to transport OIL's free gas and surplus associated gas.

A spurline of 18 from Lakwa to Moran on the trunk pipeline will transport ONGC's surplus associated gas. The capital investment for laying the trunk and spurlines would be about Rs. 160 crores. The trunk pipeline can be extended to other parts of Assam as and when additional gas becomes available. The majority of oil/gas fields in upper Assam valley lie in the south-eastern part of a hidden basement high. The alluvium-covered foreland shelf zone of upper Assam which is a part of the major Assam-Arakan basin forms the north-eastern corner of the Indian subcontinent. The bulk of the hydrocarbons discovered so far in the region is contained in the upper barails of oligocene age and in the tipams of miocene age. The presence of producible oil and gas has also been established in older eocene rocks and also in younger girujan clay formations of upper miocene age in some areas of the upper Assam basin.

ASSOCHAM calls for greater availability of raw materials

The Associated Chambers of Commerce and Industry of India (ASSOCHAM) has called for greater availability of certain raw materials, both in terms of quantity and quality, in critical sectors so as to step up industrial growth to 10 to 11 per cent, in the current year and also in the Eighth Plan period as against nine per cent in 1988-89.

According to the ASSOCHAM study on "industrial sector: problems and prospects", the shortages of raw material and their irregular supply have hampered the growth of certain industries. The electrical equipment sector experiences difficulty in procuring PVC resin, copper, plasticiser and steel wire. Also, the quality of indigenous PVC compound and resin is not up the required standards. The non-electrical machinery is affected by shortage of pig iron, ferro silicon and certain steel items. The difficulty is also experienced in regard to lead time and supply of material according to the specifications.

The pharmaceutical sector is handicapped because of erratic supply of inputs like heavy chemicals and polymers for packaging. The high prices of these items escalate the cost of end products. Inadequate availability of aluminium ingots, steel scrap, CR coils, zinc, etc. limits the production of metal and metal products. In petrochemicals, the plastic resins are not available in adequate quantities. Difficulty is also experienced in regard to specialised plastic resins which are not manufactured in India. The chemical sector finds difficulty in procuring solvents like toluene, xylene, titanium dioxide.

The synthetic fibre industry faces shortages of basic raw materials like caprolactam, DMT and MEG, while the uneven quality of coal supplied to cement plants results in various kinds of operational constraints. According to the study, while industries generally do not have any problem in importing raw materials which are on the OGL list or are being canalised through MMTC, chemicals and petrochemical units experience delays in procuring the items in the restricted list due to cumbersome procedures.

Certain other units particularly those engaged in production of automobile parts, automobile tyres and steel are affected by high customs duty on certain imported inputs. Some of the units, particularly in electrical and non-electrical machinery and pharmaceuticals find that domestic prices are much higher than the cost of imported raw materials. Also, the quality of imported raw materials is superior than that of the indigenously procured items.

GLASS INDUSTRY MAY BE ALLOWED TO RAISE CAPACITY

The Government is likely to allow enhancement of production capacity for glass and glassware industry. However, it would be subject to export obligation. This was announced by the Minister of State for Commerce, Mr. Priya Ranjan Dasmunshi, at New Delhi on August 10, at the 45th annual session of the All-India Glass Manufacturers Association.

The Minister urged the industry to come up with concrete proposals for increasing glass and glassware production in the country so that these would be processed in consultation with other Ministries and concerned departments.

He said that glass and glassware exports have not kept pace with the growth in world trade. He assured the industry of the Government's full support in tapping the vast potential of this important non-traditional sector. The industry on its part should make greater efforts to increase exports which presently average around Rs. 42 crores annually, Mr. Dasmunshi added.

The Government is willing to c sider review of cash compensatory s port (CCS) rates for glass and glassw if the industry comes up with the revi data justifying such a review. Me while, on the basis of data already s mitted by exporters, the Governm has decided to grant CCS at the rat five per cent for glass and glassw products. CCS for flat glass has b granted at eight per cent including sh and wire glass.

STRINGENT RULES FOR WAS DUMPING

Import of hazardous wastes from country for dumping and disposal India will not be permitted under new hazardous wastes (managem and handling) rules, 1989. Howe import of such wastes may be allo for processing or reuse as a raw ma ial under stringent conditions, acc ing to the rules, a copy of which tabled in the Rajya Sabha on August by the Environment and Forests Mi ter, Mr. Z.R. Ansari.

The exporting country or exporter, as the case may be, sho notify the Indian Government of proposed transboundary movement hazardous wastes. The Government grant permission for import of was subject to certain conditions.

Any importer of hazardous was should also provide information to state pollution control board about type of waste he is to import. The ru require that the Centre or the State P lution Control Board inform the c cerned port authority to take appropri steps regarding the safe handling wastes at the time of off-loading fr ships.

Under the rules, it will be respon bility of the State Governments undertake a continuing programme compile and publish an inventory sites within their territorial jurisdicti at which wastes have been stored.

surance to Maharashtra mineral units

e Maharashtra Industries Secre- Mr. S.G. Kale has assured the min- units in the State that the rnment would look into their pro- s. He also called for upgrading of ty of minerals. Inaugurating the Annual General Meeting of the eral Merchants and Manufacturers ciation of India at Bombay on ust 5, Mr. Kale lamented that a ber of businessmen were unaware document on State industrial policy, h was freely available. Not many eral units have claimed the package centives available to units desirous hifting out of Bombay, he said ng that businessmen lacked aware- on incentives provided by the State rnment in this regard. He clarified the location policy of the State rnment did not compel any indu- l unit to shift out of Bombay.

n the issue of 10 per cent sales tax minerals, Mr. Kale sought more rmation from mineral units. Octroi g a complex issue Mr. Kale said it not possible to abolish income tax excise duties. He promised mem- that he would take up these issues the Union Government. On min- nits plea to reduce power tariff, he hat the revision of power tariff was oidable even though the power urio was not so bright in Maharash- The State managed to meet the nd of the industry, he said.

r. Girish C. Choksey, president of ssociation said that the availability inerals was very poor and it was er aggravated due to export of cer- minerals resulting in shortages and ecedented increase in cost. Giving ample of superior grade barytes, id that the cost of this mineral had up by more than 50 per cent due ports.

r. Choksey lamented that the ase in Railway freight in the get by about 15 per cent alongwith oor minerals availability of wagon had affected the movement to increase in the cost. The road freight was likely to further increase by about 20 per cent due to the recent amendment in Motor Vehicles Act. Even though Maharashtra is not much endowed with mineral wealth it was the largest mineral consuming State. A substantial quantity of the country's industrial minerals are consumed in Maharashtra and exported through Bombay port.

Mr. Choksey highlighted the various problems faced by the mineral units in the State such as royalty cess and other charges, modernisation of power tariff sales tax and octroi. He made a plea that the benefit of Section 80 HHC of the Income-Tax Act should not be denied to processed minerals export.

Mr. Choksey mooted that mineral grinding should be excluded from the definition of manufacture for the purpose of excise as was the case prior to 1986. He said that the Railway should charge concessional rate of freight on minerals, considering the low value of minerals.

INVESTMENT LIMIT FOR SSI

The Federation of Associations of Small Industries of India (FASII) has demanded the investment ceiling limit on plant and machinery for SSI be raised to Rs. 50 lakhs from the present Rs. 35 lakhs. At the same time it has opposed clubbing investment on plant and machinery. This, the standing committee of the organisation which met at Madras for the first time, felt would discourage the entrepreneurs. Mr. P.B. Duggal, president of FASII briefing newsmen on the deliberations of the committee, stated that the meeting "condemned" representations being given on various official committees to individuals and proprietory concerns under the garb of 'exports'. It demanded such representation be given to institutions and associations only.

Conversion of ad valorem duties ruled out

Mr. K.L. Rekhi, Chairman, Central Board of Excise and Customs, has said that it would not be feasible to convert duties from ad valorem to specific rates, as the former offered the requisite degree of built-in progression, which was justified. He has favoured a mixed structure of duties.

Addressing a meeting organised by the Indian Merchants' Chamber at Bombay on August 10, Mr. Rekhi said that for a country like India, where four fifth of the revenue came from indirect taxation, the Central Board of Excise and Customs had to take revenue maximisation as a constant and a serious exercise while minimising multi-point taxation. He regretted that attempts to collect larger amounts of revenue by lowering taxes and creating more demand had not worked in the past as the concessions were not passed on to the consumers in terms of lower prices. As for the high duty on capital goods, he asserted that the nascent indigenous capital goods industry had to be protected.

Mr. Rekhi justified the serving of show cause notices to all directors connected or otherwise for the purpose of investigation on the ground that initially the Department had no way of identifying the official concerned.

Responding to the difficulties experienced in dealing with the tribunals, Mr. Rekhi stated that they were being upgraded and restructured in the country. The number of tribunals is likely to go up to 23 from the present 12 according to him. He promised a sympathetic look into the problems presented by the members.

Earlier, welcoming the gathering, Mr. Rohit J. Patel, President, IMC, outlined certain problems at the macro level, which needed urgent attention; if the Government policy of increasing industrial production were to fructify. He pointed out that as the high import tariff was affecting production, a graduated structure with raw materials at the lower end of the scale and components and finished goods at a slightly higher level should be devised.

Mr. Patel pointed out that specific duty rate would be more advisable than ad valorem in the context of declining value of rupee. He urged the setting up of special bench in Bombay and highlighted that in case of alleged violation of law by the assesses, show cause notices should not be served on all directors, irrespective of whether they were actively connected with the management.

Addressing another meeting organised at Bombay on August 10 by the All-India Association of Industries, Mr. Rekhi said that out of the total revenue of Rs. 50,000 crores, over Rs. 40,000 crores came from customs and excise.

Responding to the request for concession on basic excise duty on branded goods manufactured by the small units, Mr. Rekhi said that the benefits given to branded name really went to the large manufacturer whose brandname was used by the small-scale manufacturer. "We do not want to lose our revenue and benefit the big man at the cost of the small man", he said.

Replying to the question why computers are removed from small sector, Mr. Rekhi stated categorically that the decision was deliberate because, "we do not want to encourage kit culture. It is beyond the capacity of the small-scale sector to keep pace with the technological changes taking place in the world".

Earlier the AIAI President, Mr. Vijay Kalantri, pointed out that the tariff rate and the procedures in India are one of the highest and most cumbersome amongst the developing countries. Mr. Rekhi also addressed a meeting organised by the All-India Manufacturers' Organisation.

Mr. R.M. Dujodwala, President, AIMO, said that lately there had been a tendency in the revenue department to look upon the assessees with distrust and suspicion and this had been ca ing friction between the tax payers tax collectors.

He mooted ground rules for custo and excise as had been done in the c of Income-Tax Department. Mr. Du wala said that the preventive staf excise should enter the factory pre ses only during general shifts and any odd hour or holidays or night sh

GUARANTEE PERIOD FOR DU EXEMPTION SCHEME REDUC

The guarantee period under the exemption scheme by a bank has b reduced from five years to three y

A release from the Office of Chief Controller of Imports and Ex said para ten in Appendix X (indemnity-cum-guarantee bond) of export obligations to be exec under duty exemption scheme ar Appendix XIX-H-indemnity-c guarantee bond form of export ob tions to be executed by the interm ate manufacturer under duty exem scheme against intermediate ad licences has been modified to re follows:

"This guarantee by the guar bank hereunder shall remain in till...(for a period of three years fro date of the execution of the bond if no claim is made by the Govern within the said date, the guarantor will be discharged of all the liab of payment under this guarantee

It is further agreed that in the of all the obligations of this im being not duly discharged to the fu final satisfaction of the Governm the aforesaid date the guarantor and the importer shall either rene retrieve the validity of the guaran a further period as may be requi the Government or the guarantor shall pay at any time prior to the of the indemnity-cum-guarantee without any demur, the amount a be demanded by the Governme

POTLIGHT ON

Biotechnology & Life Sciences (Part 2)

OLD PROBE' KIT DETECTS OLD ON SITE

Canadian prospectors may soon use ological tools to pan gold with a kit lled 'Gold Probe', which uses anti-dies to detect the metal in soil. Gen-obe Technologies, a biotech company sed in Sydney, British Columbia, nada had developed "Gold Probe", nich detects spores of a bacterium, acillus cereus, in samples of soil. B. reus is a common soil microbe found large numbers around mineral depos-, including gold.

Conventional geochemical assays ly on sophisticated techniques of spec-ometry which involve atomising the old in the sample with a very hot flame d measuring the amount of metal esent in the sample from its charac-ristic absorption or emission of light. hese techniques can be done only in laboratory and geologists may have to ait between 2 to 3 weeks for results. old Probe works in the field and gives sults in hours. Although it is not spe-fic for gold, Gold Probe can pinpoint e most likely locations which geolo-ists should explore further.

The idea of using bacterial path find-rs to find gold is not new. John Water-on, a chemist at the US Geological urvey in Denver, Colorado, says he ecame convinced in the early 1970s at geologists could use bacteria to look or minerals, including gold.

He suggested that over time, miner-ls reach into ground water and soils hift to create a mineralised halo around old deposits. The halo, he believes, would consist of chemically active ele-ments such as Cu, Pb and Cd. Their rel-tive toxicity alters the pattern of microorganism that can survive in the soil.

For example, such soils enhance the growth of certain fungi which produces penicillin. The penicillin kills off some microbes, but leaves B. cereus to blos-som. Waterson developed a conventional microbiological test which involved the culture soil samples in the laboratory. Genprobe Technologies have refined this technology for use in the field.

The principle behind Gold Probe exploits the ability of antibodies to lock on to specific targets, in this case proteins on the outer coat of the spores of the bacterium. The more the spores, the more antibodies will bind to a particular sample. The key element in the kit is a strip, half a centimetre wide and pock marked with wells that contain different amounts of antibody. Each antibody is attached to a dye which turns blue when the antibody hooks onto a spore.

In the field the geologists place samples of soil in a grid tray. They then fit each sample with a cap holding the strip of antibodies. The spores are free to latch onto the antibodies in the wells and geologists can measure the number of spores in each sample by comparing the blue colour of the wells with a standard. (*New Sc.*, 3/25/89, p. 30).

BIOTECH RESEARCH OFFERS PROTECTION TO FOOD CROPS AGAINST VIRUSES

No chemical pesticide in the market today can fight viruses that affect crops reports Christine Newell, a virus research authority at Monsanto (St. Louis, USA). The company Monsanto (a leader in plant biotech research) has decided to attack the problem from another angle — developing crops that are resistant to viruses. Monsanto has come up with genetically engineered potatoes that resist the potato virus X and Y which cause millions of dollars in damage annually to the $2 billion US potato crop.

Monsanto is also working on mosaic virus resistance in tomatoes and insect resistance for cotton. This is the first time genetically engineered protection against two viruses has been demonstrated in Russell Burbank potatoes — the major commercial variety grown in USA. Researcher Newell notes however that several years of research are ahead before such potatoes can be on the retail market. Monsanto expects they will make debut in the mid-1990s. (*Chem Wk.*, 2/15/89, p. 26).

PHOTOTACTIC ALGAE UNVEILED

Phototactic algae, which move in response to light contain photoreceptor pigments that behave in many ways like the rhodopsin present in higher vision systems. Rhodopsin consists of the protein opsin and the polyene cis-retinal. When exposed to light, cis-retinal isomerises to trans-retinal, a reaction that initiates changes in rhodopsin. These changes culminate in nerve impulses perceived as light. "Blind" mutant strains of the algae that lack retinal also lack phototactic ability. Phototaxis can be restored however, by incubation with retinal analogies.

Although bovine and algae rhodopsin systems have been thought to be similar both in mechanism of action and genomically, these studies indicate that the algae photoreceptor is not activated by a cis/trans isomerisation of a polyene. The prokaryotic mechanism should be of great aid in development of artificial light sensitive systems, for activating retinal analogies are much simpler in structure than those found in eukaryotes. (*J. Am. Soc.*, 1988, 100, 6589 *Chemtech*, 4/1989, p. 197).

THE SAGA OF BIOTECH RENNIN

Rennin, a milk clotting enzyme used in the manufacture of cheese, is a unique example of a replacement product developed by biotechnology. Current worldwide sales of rennin are approximately $50 million. More than half of the rennin sold today is derived from its natural source, the fourth stomach of the unweaned calf. Unfortunately, the supply of this enzyme has recently become scarce because of the combined effects of decreased veal consumption and increased cheese consumption. Although microbial substitutes are marketed, they are generally not used for higher quality cheeses, because they tend to generate undesirable flavours.

These factors made calf rennin an attractive target for the biotech researchers in industry. First the enzyme is cloned, then it is produced via a bioprocess utilising a recombinant microorganism that expresses the gene. These research endeavours were successful. Recently collaborative research received a patent for the production of rennin using this biotech route.

AN UPDATE ON THE OUTLOOK FOR BIOTECHNOLOGY IN USA

What is the outlook for biotechnology in USA? What will be the major trends? It is poised for explosive new growth of simply looking at steady, evolutionary progress, what direction will it take?

The biotech industry in USA is moving into a rapid growth phase. The flow of products has so far been only a trickle. The rate of product production will undoubtedly increase dramatically during the next few years (refer Table).

Most products will be for the pharmaceutical market, where the technology is further long than in other sectors and where profit expectations are the highest. However, research in agriculture and other areas has advanced faster than was first anticipated. With all the new products entering the market place in the coming decade, the biotech industry in USA should grow at a compound rate of about 30% per annum through the end of the century.

As the industry enters its growth phase, marketing will steal the limelight from R & D in terms of relative strategic importance. Management style and corporate strategy will need to shift as cost control and cost cutting become key. The critical challenge will be to manage the shifting financial, marketing regulatory and production priorities.

Industry consolidation will continue, if not accelerate. Already fewer new companies are being started. Mergers and acquisitions will almost certainly become more frequent. It is anticipated that in ten years, the number of independent biotech companies will be half of what it is today.

Table

Summary of New US Biotech Sales forecasts by Key Market Segments 1993 and 1998 (million 1988 dollars)

Key sectors	Base year 1988	Forecast years 1993	1998
Human therapeutics	500	1585	5465
Human diagnostics	290	680	2005
Agriculture	35	530	2065
Specialities	50	175	900
Contaminant monitoring	5	75	200
Total (average)	**880**	**3045**	**10635**

The biotech industry in USA is ering a dynamic new growth pl During the coming years a signif flow of new products will be ent the market, pushing industry beyond $10 billion within ten ye

As products continue to push thr the development and testing st marketing decisions will become cal. Competition from other biotech blue-chip companies will inten often crowding the same markets similar products.

This competitive situation will c a good marketing plan that is n more essential. Product strategy marketing strategy will be vital for cess in biotech enterprise. (*Chem* 4/1989, p. 220, 218).

IMMUNOLOGY LIMITED — NEW UK BIOTECH FIRM

Some heavy weight academics industry-based scientists are behi new UK biotech company c Immunology Ltd. It has been set u concentrate on cell biology and ge engineering in order to develop the generation of therapeutic products b on immunology.

Immunology Ltd. has been e lished in Cambridge by Dr. Munro, previously head of immuno division at Cambridge University Dr. Stephen Bunting, a directo Abingworth Management.

The new company is currently i process of recruiting a chief execu officer to head the management which consists of Dr. Munro as rese director and Dr. Bill Duncan, ex-de chairman of ICI Pharmaceuticals non-executive chairman. Dr. Bur and Dr. Combes formerly pharmac ical R & D director of Hoechst are now executive directors. (*Chemist*, 4/1989, p. 7).

ENTRE FOR BIO-CATALYSIS ENCE & TECHNOLOGY 'ABLISHED IN USA

newly created Centre of Bio-lysis Science & Technology is start-up at Utah State University with a nt of $670 000 from the Utah partment of Community & Eco-nic Development. The Centre is nging up scientists and engineers n a variety of disciplines to develop technology to observe enzymes.

The Centre represents the only effort biocatalysis that combines basic and plied science for technology devel-nent according to the centre director da S. Powers, who holds degrees in physics and physics with 12 years perience as a research scientist at AT T Bell Laboratories. In cooperation h Utah State University Centre for ce Engineering, Biocatalysis Centre earchers will develop time resolved rumentation. (*C & EN*, 1/16/89, p.

DIVIDUAL DNA MOLECULES SERVED IN GELS UNDER A UORESCENT MICROSCOPE

ndividual DNA molecules stained h dye can be observed under a fluo-cent microscope mending their way ough agarose gels during electroph-sis, according to researchers from the iversity of Washington, Seattle.

Knowing how the molecules migrate help in improving separation of e DNA strands, report researchers he Department of Genetics. They d that the DNA molecules move ough the gel as if they were a string reads confronting a lattice of obsta-s. The DNA molecule alternately ngate in the direction of the field and n contract, sometimes forming a U pe when they get hooked around an truction. A video cassette showing ividual molecules in motion is avail-e from Instructional Media Services SB-54, University of Washington, Seattle, Wash. 98195, USA. (*Science*, 243, 203, (1989)).

BIOTECH RESEARCH AT GENEX SPAWNS BIOADHESIVES FOR DENTAL AND MEDICAL USES

Genex, a leading biotech firm in USA looks towards bioadhesives as the most promising products for the future. The company research on bioadhesives after Herbert White a professor of biochemistry at the Connecticut University, isolated a non-immunogenic adhesive derived from the blue sea mussel, while identifying the adhesive as a decapeptide.

In a separate effort Genex funded an in-house programme to clone the gene producing the non-immunogenic adhesive from the blue sea mussel. Genex now has a patent pending covering microbial production of its recombinant adhesive protein via a fermentation and purification process.

Genex ran into a problem with Bio-Polymers (Farmington, Conn) that had an exclusive license to a prior University of Connecticut patent relating to mussel adhesives.

However, Bio Polymers, recently granted Genex a non-exclusive royalty bearing sub licence to the patent, thus ending a suit between the two companies.

With the patent dispute out of the way, Genex believes its process patent covers the lowest cost route to the mussel protein. The adhesive principal attribute is that it can stick to almost anything and stay glued to a surface even under water.

In mid-1984, the company formed a joint development programme with W.R. Grace & Co. The two companies are sharing research chores on FDA applications in which they are seeking approval for medical and dental uses of the adhesives. According to David R Goodrich (vice-president of specialty projects at Genex), it will be 1992 at the earliest before Genex will be marketing biotech adhesive products.

But when approval is received, Genex is looking toward supplying a substantial market demand. At present Genex has scaled up to produce only milligram quantities for testing. Without its fermentation process, it would take between 50,000 to 100,000 mussels to produce first 1 gm of the adhesive material.

Medical adhesives of the future could either replace or serve as an adjunct to the suturing of wounds, allow bone and wound repair and provide for dental-bonding of caps and crowns. Further, they would be non-toxic, biocompatible and durable.

A recent market study by Business Communications, (Norwalk, Conn) estimated that the market for bioadhesives in USA alone will grow from $12 million in 1983 to $30 million in 1992. Goodrich foresees much greater opportunities for bioadhesives. For ophthalmic bioadhesives alone can achieve sale of $100 million by the mid 1990s. (*C & EN*, 2/27/89, p. 46).

THE WORLD'S FIRST LARGE SCALE TRIAL OF BIOREMEDIATION BEGINS IN ALASKA

EPA of USA will launch a bacterial clean-up experiment in June 1989 in Prince William Sound, Alaska, where the worst oil spill in US history occured last March. It will mark the first large scale experiment in bioremediation, the use of microorganisms to clean up polluted water.

Scientists hope to eventually use specially bred bacteria to attack a variety of toxic chemical wastes wastes such as creosote, dioxins, coal tar and solvents. (*CMR*, 5/29/89, p. 7).

Photofilms, pharmaceuticals or refrigerants...

MCIC chemistry is at work

Available in tankers and small or large-sized drums.

Chloromethanes from MCIC

Chloromethanes... wonder chemicals which reach out to touch almost every facet of our life. In the form of methyl chloride as a catalyst-carrier in low temperature polymerisation... in the food industry.

As methylene chloride in the production of pharmaceuticals... in photography for the manufacture of X-ray films. And as a solvent for many insecticides like DDT, and in the manufacture of foams.

As chloroform... in the production of pharmaceuticals, and refrigerant gases.

As carbon tetrachloride... in the manufacture of refrigerant gases. And as an ideal solvent-diluent for numerous applications

With over 50 years' pioneering experience in various chemicals, MCIC's expertise extends to providing technical guidance and service to meet specific requirements.

In addition, MCIC has a nationwide distribution network that gives you what you want. Where you want. When you want it. Result: no inventory build-ups. No anxieties. No import formalities either.

For details, contact:

The Mettur Chemicals & Industrial Corpn. Ltd.
75 Cathedral Road Madras 600 086
Tel: 476504 Telex: 041-7305

BRANCH OFFICES:
C/o Chemicals and Plastics (India) Limited

- Jitendra Industrial Estate
  (Opp Sangam Theatre) Andheri-Kurla Road
  Bombay 400 093 Tel: 6343805/6346475
  Telex: 011-73039 Grams: GEON VINYL
- "Rachana" I Floor
  Pusa Road 2 Rajendra Place
  New Delhi 110 008 Tel: 5711949
  Telex: 031-77204 Grams: GEON VINYL
- (Fine Chemicals Division)
  A-203 Blue Cross Chambers
  II Floor Infantry Road Cross
  Bangalore 560 001 Tel: 579250
  Telex: 0845-8363 Grams: VIORYL
- 8/1-A Little Russel Street IV Floor
  Calcutta 700 071 Tel: 442764/434578
  Telex: 021-7541 Grams: GEON VINYL

MCIC: Consistent quality. Committed service.

RK SWAMY/MCIC/7040

Science Briefs

INDIA TO LAUNCH PROGRAMME ON MOLECULAR ELECTRONICS

The science of molecular electronics that seeks to bring about a synthesis of modern biology with physics for the development of a new breed of electronic devices is now emerging in India. Researchers at a workshop on molecular electronics organised in New Delhi recently drew up guidelines for a national programme that will aim at the indigenous development of molecular electronic devices like biosensors and hybrid transistors.

Atoms and molecules that make up all matter constantly exchange electrons among themselves. This electron transport leads to changes in the electrical and sometimes optical properties of molecules and forms the basis for molecular electronics. Molecular electronic devices are expected to have many advantages over conventional devices. They will be flexible, lighter, and their size, shape and properties could be controlled by chemical modification.

Perhaps the fastest growing area of molecular electronics is the field of biosensors which are highly sensitive devices designed to detect the presence of minute traces of substances. A biosensor works by converting the concentration of an analyte in an appropriate sample into an electrical signal using a biological sensing element which is integrated into a transducer.

In a biosensor, a biological substance is used for the specific recognition of the analyte in a sample. The substance responds with a change in one of its physiochemical parameters triggered off by the interaction with the sample. The signal can be translated into an electrical signal before it is amplified, digitized and recorded in a desired form. The contact between the biological and electrochemical systems in biosensors is usually achieved by immobilisation of the biosensing element system on the transducer surface by using a physical restraint behind a polymer membrane or within a gel matrix.

Biosensors are simple-to-use devices, inexpensive, disposable and do not require reagents as most other conventional technologies for sample analysis do. Researchers believe that biosensors could soon be used for detecting explosives, and toxic pollutants in air and water. Researchers at the Indian Association for the Cultivation of Science (IACS) in Calcutta have been investigating the properties of a group of pigment molecules called carotenoids.

IACS researcher Dr. T.N. Mishra and his colleagues have observed that the electrical properties of carotenoids are highly sensitive to the ambient atmosphere. The conductivity of certain carotenoids rises nearly a million times above the normal value when exposed to some gases. The molecules interact differently with different gases. This property, the IACS scientists believe, could be used to develop biosensors for specific gases.

Carotenoids are also highly sensitive to light. In some of these molecules there is a 1000-fold increase in electrical conductance when they are exposed to light. This makes it a promising material for the development of optical switches, Dr. Mishra who attended the New Delhi workshop said.

Some electroactive polymers also show photoconducting properties. Others respond electrically to pressure and temperature change and conversely develop mechanical distortion or a temperature change when subjected to an electrical field. This property can be used to make transducers in sensor.

Studies show that a conducting polymer called polypyrrole when immersed in an electrolyte exhibits behaviour similar to that of a transistor. Researc at the National Physical Laborato New Delhi who have synthesis range of conducting polymers now to work on the fabrication of electr devices. Initially the group will wor the development of diodes and tra tors which will hybrid devices mac both conducting polymers and con tional solid state devices. "Our ulti goal is to develop an organic de made completely from organic m cules", said Dr. B. Malhotra, researcher.

Scientists from the Tata Institu Fundamental Research in Bombay attended the workshop reported they have successfully immobilis coenzyme called Nicotinamide Ad Dinucleotide (NAD) on a clear surface of platinum. NAD is one o most important enzymes involv biological redox reactions. The st with this immobilised coenzyme that electrons can be made to flow the platinum surface to the entra coenzyme molecule and the othe around by applying a suitable vo They also show that the immob NAD is optically active and ca switched chemically. This work up new vistas for utilising NA making molecular switches, researchers said in a paper presen the workshop.

The electrical switching can w used for specific tasks in the fi biomedical, bioengineering and chemical measurement, the team s their paper.

The first phase of the research gramme envisages work on three of biosensors: one for glucose, o urea and a third biosensor for the mination of pollution levels in The first two are expected to find ical applications and the poll detecting sensor could find use in quality monitoring programmes.

P.T.I. Science S

GINEERED ENZYME WASHES ITER THAN WHITE

uring the next year, people in ope should be able to buy washing der containing an enzyme that can k down fats. Manufacturers have l enzymes in household detergents everal years because they can break n carbohydrates, proteins and nuc- acids in stains on clothing. Until , no one has developed a commer- y available enzyme that will break n fats, reports "New Scientist".

he new enzyme Lipolase is genet- y engineered by the world's larg- producer of industrial enzymes, a ish company called Novo-Nordisk. company, which manufactures lin and human growth hormones as as industrial enzymes claims that lase is the first widely available strial enzyme to have been pro- d by genetic engineering. The vast rity of enzymes used in detergents roduced by traditional fermentation nology rather than genetic engine- g.

he search for an enzyme that will k down fats has proved to be the t difficult problem for detergent ufacturers and biotechnologists. In unt for a suitable enzyme, Novo- disk investigated a range of mes called lipases whch catalyse breakdown of fats into fatty acids glycerol. Molecular biologists at the pany identified a fungus which will luce a specific type of lipase that is d at breaking down the fats found uman foods.

he geneticists identified the ence of amino acids which make up DNA of the fungus and cloned that ence. They then spliced the section he DNA which holds the gene that es for the lipase into a new host nism, a filamentous fungus called rgillus oryzae. Novo Nordisk d that it will produce the lipase in sufficient quantities to enable them to sell it at a reasonable rate to detergent manufacturers.

Novo claims that its Lipolase enzyme will work at low temperatures of today's washing cycles, and that it is washed away with the water leaving none on the clothes. It also claims that the genetically engineered enzyme will not irritate the skin. After a couple of days the enzyme breaks down in the environment to leave water, carbon dioxide and nitrogen, and Novo claims that it has no adverse effects on organisms living in water. Also, the genetically engineered Aspergillus fungus does not establish itself in the environment if accidentally released from the production plant, since it is much weaker than the parental strain.

P.T.I. Science Service

DISTILLING SEA WATER THROUGH SOLAR ENERGY

A new method of distilling sea or brackish water through solar energy to make it potable or for use in lead acid batteries, has been developed by the Space Application Centre, Ahmedabad. The SAC director, Mr. Pramod Kale, said that by employing the technology and principles of operation of solar cookers and solar water heaters using the flat plate solar energy collectors, a unit comprising an insulator, evaporator, condenser and distilled water outlet has been developed.

The technique for distilling water was based on the premise that on a sunny day, one square metre of exposed water in a tank loses about four litres of water through evaporation. Since the evaporation occurred at a low temperature, if a unit was properly engineered, at least three litres of distilled water could be procured for every square metre of area exposed. At present the centre was distilling about six litres of water per day, which was free from all impurities. The material required for the construction of the unit is easily available. Mr. Kale said the new technique could be useful in several parts of the country where fair weather prevailed, especially northern Gujarat, Rajasthan, northern parts of Karnataka, Andhra Pradesh and Tamil Nadu and coastal areas.

P.T.I. Science Service

BIOGAS FOR COTTON SPINNING MILLS

Willow dust, a waste from cotton spinning mills that is used as a feedstock has successfully been tapped as an alternative to produce biogas by large-size plants. The new, improved technology and support facilities provide an economical and efficient method to produce a sizeable quantity of biogas and organic manure. In addition, it helps to solve the problem of pollution, and disposal of huge quantities of willow dust, a waste churned out daily by cotton spinning mills, according to a release from the Department of Non-Conventional Energy Sources (DNES).

DNES, through its Biogas Research Centre at the College of Technology and Agriculture Engineering, Udaipur, has designed and set up such a plant at Udaipur Cotton Mills, in the city. The biogas plant has got a capacity to produce 20 cu. mt. of gas per day. The technology has several innovative and beneficial features in terms of quantity of gas generated, better quality manure, and reduction in the duration of slurry drying up as manure to five days compared to 10 days in the case of dung based slurry. The plant also provides for self-loading and unloading facility systems to separate the water from the slurry and its re-use for filling the plant.

The Udaipur Cotton Mills produces 125 kgs. of willow dust per day of which 100 kgs. are adequate to operate the plant. The gas produced from the plant is equivalent to 80 kgs. of wood equivalent per day. The production of dry manure is 2.5 tonnes per month

valued at Rs. 1,250. The slurry is a rich manure as it contains 1.5 to 1.7 per cent nitrogen. The plant is nine times more economical as it provides for cost savings incurred by textile mills on lifting, transporting and dumping the willow dust at distant places and the big chunk of land required for such disposal. The traditional method of disposal of willow dust is unhygienic, pollutes the environment through the foul smell that is emitted as the willow dust takes one year to decompose into organic manure. The plant is quite economical since its capital cost is only about Rs. 90,000.

Dr. Maheshwar Dayal, Secretary, DNES, has expressed the view that most of the cotton spinning mills in the country can set up such biogas plants and reap benefits of the new technology developed by indigenous efforts. A number of units under the National Textile Corporation have evinced keen interest in setting up of such plants. The technology developed at Udaipur is readily available almost free of cost for transfer to users.

P.T.I. Science Service

LIGHT PROBES THE DEPTHS OF OIL SLICKS

Lasers are enabling scientists who assess oil slicks to make accurate measurements of the extent and thickness of spilt oil. Once the prototype for the detector is fully developed, it should dramatically improve techniques for monitoring and cleaning up oil in oceans and rivers, reports "New Scientist".

At present, people monitor oil slicks visually, either by plane or by boat, but this method is unreliable because many other features on water can resemble a slick. Even highly-experienced observers are frequently fooled by the so-called "wind slicks" — areas of calm beyond a stretch of water whipped up by the wind — and by patches of water whose varying temperatures give them different colours. Floating pine needles, seaweed, the sperms of whales and herring, glacial runoff and large volumes of fresh water from a stream can also look like oil.

Conversely, observers frequently miss the oil on heavily fouled beaches that are very wet, or oil that has formed "sheens" — extremely thin slicks with only a few litres of oil spread over a square kilometre. The team that developed the laser detector drew its members from two organisations within the Canadian government, and from the Esso Resources Canada and the US Minerals Management Service.

The researchers claim that the detector is not fooled by "false" slicks and that it gives more precise information than a trained eye about the extent and thickness of spilt oil. It would enable those who clean up after an oil spill to use their equipment and resources more effectively, they claim. For example, vessels skimming the oil off the surface of the water must work at the thickest part of the slick if they are to be efficient. But it is virtually impossible to judge thickness of the slick by eye.

P.T.I. Science Service

HIGH-YIELDING EUCALYPTUS

Scientists at the Central Institute of Medicinal and Aromatic Plants (CIMAP) have identified several eucalyptus species that can yield large amounts of oil and timber. Following a vigorous screening programme involving about 40 diverse species of eucalyptus growing in the Kumaon region of Uttar Pradesh, scientists at the CIMAP Regional Centre, Pantnagar, Uttar Pradesh, have found that leaves of Eucalyptus robertsoni have an exceptionally high oil content with 75 per cent cineole (a colourless oil with a camphor-like odour, which is used in pharmaceuticals, perfumery and flavouring). The scientists, who have named the species "Super Cineole Plant" say this is the first instance of identifying E. robertsoni as a reservoir of eucalyptus oil rich in cineole.

Similarly, Eucalyptus melano with 2.03 per cent oil containing 7 cent cineole, was found to be most able for the Terai belt. While the use of eucalyptus trees is for paper timber and fuel, the oil-bearing p tial of their leaves and twigs th wasted while felling the trees ha been fully exploited.

HYACINTH BIOMASS

Aquatic biomass bears some leged characteristics which cann discounted by those concerned developing new alternative sour energy. The characteristics are: ve growth rate owing to a hydrous ronment, unlimited annual produc considerable ability of absorbing dissolved or suspended in liquid w and as a result, increased efficie purifying wastes.

The most productive of these tic plants, the water hyacinth, is c of surpassing a productivity of 5 tonnes under normal conditions also been proved to serve well as feed, and fertiliser (CEDUST).

THE SUGAR SUBSTITUTE

The USA has plenty of co insufficient home-grown sugar. E technology has provided a way o corn to reduce sugar imports.

In 1970, the average Americ sumed about 100 lbs (45 kg) of sugar either as table sugar or as prepared food and drink. By 19 consumption of sugar had dropp matically to about 63 lbs (29 k explanation is not that vast nun Americans have gone on a d avoided sweet foods. In fact, t consumption of all calorie swe per capital in the USA is now at What has happened over this p that to a large degrees sugar h replaced in the food and drink try by high fructose corn syrup (This change will have gone u

merican consumers. HFCS has st exactly the same properties as , so processed food and drink taste ook the same.

with starch

tural sugar is made from cane or sugar. HFCS is made from corn — eal hardly renowned for its sweet but rich in starch. Using enzymes, n can be broken down into simple s. The production of HFCS ves a three-step process. Firstly, the n is liquefied into a stable dextrin rate using an alpha-amylase, for ple Termamyl®. Then saccharify- nzymes such as Dextrozyme® are ed to break down the dextrin st completely to glucose. The final s isomerisation where the purified se is converted into fructose by an bilised glucose isomerase. Novo's tzyme® was the first such immo- d enzyme produced and sold on an trial scale. Immobilising the iso- se enables it to be used continu- for many months.

lar to sugar

FCS matches sugar in almost every ct — quality, degree of sweetness calorific value. But unlike sugar, S does not crystallize and is always ied as a liquid. Therefore HFCS ot be used where a dry sweetener quired, for example in dry mixes most confectionery. Apart from exceptions, HFCS can replace to a greater or lesser extent in a range of food and beverage app- tions.

ntil the development of high fruc- syrups in the late 1960s, glucose teners made by the hydrolysis of h had been on the market. How- due to their relatively low degree veetness compared to sugar, their was limited to applications where sweetening power was not the e consideration.

hen high fructose syrups became able, they provided a real alterna- tive to sugar. Although a number of synthetic sweeteners have since come onto the market, none has challenged the position of the high fructose syrups.

Two types

Two grades of high fructose corn syrups have established themselves on the American market — HFCS-42 and HFCS-55. They have the following compositions:

	HFCS-42	HFCS-55
Fructose	42%	55%
Glucose	50-53%	38-41%
Other sugars	5- 8%	4- 7%

HFCS-42 is slightly less sweet than sugar while HFCS-55 is slightly sweeter. The first grade is used in the baking industry for bread and cakes, in canned fruits and in dairy products such as drinks and frozen desserts.

The second grade was developed especially for the soft drinks industry and this is where the real breakthrough for HFCS occurred in the USA.

The cola breakthrough

Starting in the late 1970s, HFCS was used instead of sugar in non-cola soft drinks. In 1980s, HFCS was first used as 50% of the sweetener in Coca-Cola and likewise for Pepsi-Cola in 1983. By 1984, HFCS was approved to replace sugar totally in these world-famous brands.

Largely as a result, HFCS consumption rose by 1 million tons (dry basis) in 1985 — up by a quarter in a year. The significance of colas should not be underestimated. In 1985, about two-thirds of the US soft drinks market in terms of volume was accounted for by colas. They are part of the American way of life.

Today, the soft drinks industry as a whole uses about two-thirds of all the HFCS consumed in the USA. Sugar sales to the soft drinks industry have been substantially reduced.

How much more HFCS

HFCS consumption in the USA grew rapidly from 0.5 million tons (dry basis) in 1975 to 5.4 million tons in 1988. Today, HFCS accounts for over a third of the calorific sweetener market.

Conditions in the USA have been extremely favourable for the growth of HFCS. Corn is plentiful and the USA was dependent on sugar imports. Furthermore, the US sugar market is regulated by government intervention; prices have been kept high to encourage domestic sugar production and the expansion of HFCS at the expense of sugar.

HFCS has consistently been priced at a level 10-30% cheaper than sugar and this has given sugar-users an incentive to switch. Industry sources, such as McKeany-Flavell, believe that HFCS penetration has reached a saturation point in the USA. HFCS has almost completely replaced sugar wherever technically feasible. The period of rapid growth is over.

The increased use of low-calorie sweeteners will also slow down the growth of HFCS. Take for example the cola companies that gave HFCS a seal of approval — they are also actively promoting diet colas.

Other markets

The USA is the most significant market for high fructose rups and consumes about 75% of world production. Japan, the world's second largest importer of sugar, is another significant market for HFCS, as is South Korea.

In Europe, the promise of the isomerase enzyme process have never been fully realised in the member countries of the European Economic Community. Domestic sugar growers and refiners formed a strong lobby to fight the threat posed by high fructose syrups. As a

a result, quotas were introduced in 1977 and EEC production is strictly limited to about 320,000 tons (dry basis).

Major substitution of sugar by high fructose syrups has so far been confined to only a few countries. In the USA and Japan, the expansion of high fructose syrups has been helped by an artificially high price for sugar compared to the world market price.

Many other countries, particularly in Asia, are interested in reducing their dependence on sugar imports. The great advantage of high fructose syrups is that raw materials are available wherever a starch-containing crop is grown.

The source of starch need not be corn. Indonesian plants use tapioca starch; broken rice is used in Pakistan and wheat is used in Australia.

For countries in the tropical and sub-tropical regions, the use of manioc has great potential. In total, there are now about 80 commercial plants for producing high fructose syrups around the world.

Success story

For Novo, the starch industry is a very important market as it is the second largest industry segment for enzyme sales. Sweetzyme, Novo's immobilised glucose isomerase, has been continually improved since its introduction in 1973. The latest version is Sweetzyme T, which gives up to 50% better syrup productivity than its predecessor Sweetzyme Q.

The enzymatic conversion of glucose to fructose on a huge industrial scale has been a big success story for biotechnology, especially in the USA. Without enzymes, high fructose syrups could never have been made.

What is sugar

Glucose, fructose and galactose are the three basic monosaccharides (single sugar molecules). From these three units, other sugars are formed either naturally or by processing techniques. The following disaccharides are composed of two monosaccharides joined together.

$$\text{sucrose} < \begin{matrix}\text{glucose}\\ \text{fructose}\end{matrix}$$

$$\text{lactose} < \begin{matrix}\text{galactose}\\ \text{glucose}\end{matrix}$$

$$\text{maltose} < \begin{matrix}\text{glucose}\\ \text{glucose}\end{matrix}$$

Other sugars are formed by the joining up of more units. Starch itself is composed of long chains of glucose molecules. Glucose is the basic unit of which many sugars are posed and to which most sugar starches are broken down. Dextr pure glucose. Fructose or fruit su present in most fruit, many vege and honey. It is the sweetest common sugars.

Sucrose is the sugar most of familiar with in our homes as wh brown sugar. It comes from cane sugar and is composed of equal p glucose and fructose. (In the artic term 'sugar' refers to sucrose).

Invert sugar is formed by the lysis of sucrose to a mixture of fr and glucose by the enzyme inv High Fructose Syrup (also kno High Fructose Corn Syrup, iso isoglucose or starch sugar) is che and physically the same as invert It is a mixture of glucose formed isomerisation of glucose usi enzyme glucose isomerase.

Lactose is also known as mil and is naturally present in milk. M is found in sprouting grains and cereals.

For more information contac & Co., 2-C, Kitab Mahal, 1st 192, Dr. D.N. Road, Bombay-4

READILY AVAILABLE FROM DEPOT AT DOMBIVLI AND BOMBAY

'NPL' HYDROGEN PEROXIDE 50%

MFG. BY NATIONAL PEROXIDE LTD.

AUTHORISED AGENTS:

PAREKH DYES AND CHEMICALS

General Assurance Building, 3rd Floor, 232, Dr. D.N. Road, Bombay 400 001

Phone: 2045154/2042398
Dombivli - 5687

WATER TREATMENT PLANTS

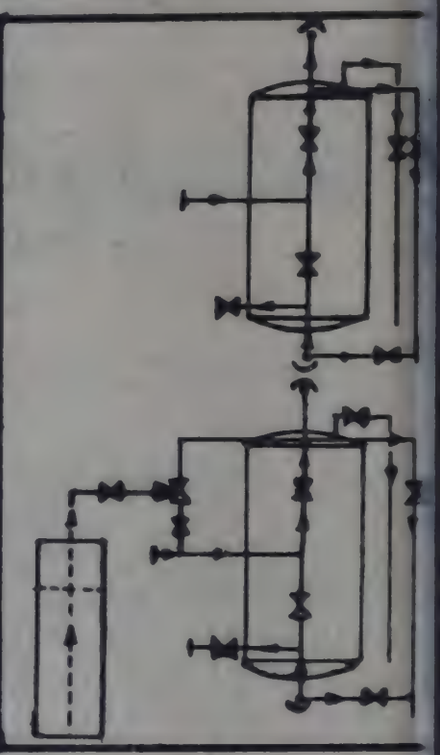
- **For people who want high performance and professional service.**
- **Plants of 10 to 35000 Lts per hour capacity.**

WATER SOFTENING, DEMINERALISATION, DOSING, PRESSURE FILTER, CARBON FILTER

- **For Boilers, Chemical, Engineering, Processing, Pharmaceuticals, Sugar, Distillery Industries with prompt after sales services & one year guarantee**

Contact Office: **SERVO FLOW ENGINEERS**

3, Gomti Smruti, Jamali Gully,
Borivali (W), Bombay-400 092.
Phone: 6054418



ATTENTION INDUSTRIES!

For Your Requirements of:

CHEMICALS

(Purity 98% Min.)

* AMMONIUM THIOCYANATE
* SODIUM THIOCYANATE
* POTASSIUM THIOCYANATE

USED IN ELECTROPLATING / WATER TREATMENT
ABRASIVE & POLISHING MATERIALS /
PHARMACEUTICAL INDUSTRIES

Please Contact Manufacturers:

M/s. INTERMEDIATES & CHEMICALS

6, First Floor, Swastik Super Market, Ashram Road, Ahmedabad 380 009.
Phone: Office: 449807 **Fact: 810482** **Resi: 406075**

(KNS-A1

otential of Chemical & Petrochemical Industry in Gujarat

A.K.A. RATHI
Technical Adviser (Chem), Industries Commissionerate, Government of Gujarat, Ahmedabad 380 001.

ujarat ranked 8th among the industrialised states in the ıtry at the time of its birth as a separate State in 1960. e then it has witnessed spectacular growth and has me the second largest industrialised State in terms of s output and value added per employee. From 3,000 small industries and almost equal number of factories dom- d by textile industry during its inception, the number has ased to 80,000 small scale industries and more than 00 factories at present.

ujarat produces almost all types of chemicals required arily for improving the living standards of human beings. e include petrochemicals, agrochemicals, dyes, drugs, iality chemicals, organic chemicals, inorganic chemicals, alkalies, surface-coating products, oil and fats, soap and gents, man-made fibres, plastic conversion. Findings of nd natural gas in the early sixties played a vital role in levelopment of chemical and petrochemical industry in State. The long coast-line gives an added advantage to arge non toxic effluent, duly treated to meet relevant lards.

e first integrated chemical complex of the country was ned and implemented at Atul, Valsad. Gujarat Refinery e largest refinery in the country with refining capacity 3 million tonnes per annum. Gujarat Narmada Valley liser Co. Ltd. operates the largest single stream ammonia 50 tpd) and urea (1,800 tpd) plant in the world at Bha- . Indian Petrochemicals Corporation Ltd. is the largest only one of its kind in the country at present. Gujarat dies & Chemicals Ltd. have the largest facility for the uction of caustic soda and chlorine. Tata Chemicals have argest marine chemical complex including soda ash. Five fertiliser plants — producing both nitrogenous and phatic fertilisers operate in the State. Gujarat has the dis- ion of producing some products which are only one of kind in the country namely caprolactam, melamine, poly hyl methacrylate, cyanides, citric acid, maleic anhydride, gene etc. Some of the new projects under implementa- for the first time in the country include alpha olefins, acetals, polycarbonates, and acetic acid based on meth-

ujarat produces 75% of the country's acrylic fibres, 66% food, 50% on-shore crude oil, 30% drugs and phar- euticals, 53% of petrochemicals products, 75% of phos- ic fertilisers, 75% of salt, 94% of soda ash. This gives dication of the strong base of chemical and allied indus- n Gujarat which has given it a pride position as the 'Chemical State' of the country, accounting for about 16% of the chemicals and allied products produced in the counury now which is likely to go upto 20-22% by the end of Eighth Five Year Plan.

Unlike other industries where once a prototype is developed, mass production can start, in the chemical industry a product/process is developed on laboratory stage and it passes through pilot plant stage before a commercial plant is set up. Thus the chemical industry is a unique technology oriented industry. Whereas India contributes 15% of the world's population, its share in the production of most of the chemicals and petrochemicals is insignificant. Only in case of fertilisers, it contributes to 8% (approx.) of world's production.

The next decade is likely to see further growth of chemical and petrochemical industry, based on the strong foundation already laid in the last two decades. The major growth areas shall be in the petrochemical and gas based industries, concentration of which is likely to be around Hazira and Bharuch.

Considering the global demand for several chemicals and petrochemicals and the need of earning valuable foreign exchange, there appears good potential for 100% export oriented projects including vinyl acetate monomer, chlorosolvents, phthalic anhydride and amino acids. Needless to mention that such projects should be of world size and should be located near a port. Gujarat has longest coast-line of 1,500 kms., and several suitable locations could be selected for siting such export oriented projects.

Considering the requirement of intermediates for dyes, drugs and pesticides, a large complex on the lines of Hindustan Organic Chemicals could be set up in central/southern Gujarat immediately. Such a complex may start with products including concentrated nitric acid, nitrobenzene, chloro benzenes, aniline and nitro chloro benzenes. With several fertiliser plants in the State, ammonia for nitric acid production could always be easily available. For nitration, new technology avoiding usage of sulphuric acid merits developmental efforts.

Traditionally, Gujarat was considered deficit in alcohol. Considering the performance of sugar factories and thereby availability of molasses and also several proposals of setting up new sugar factories, there appears scope for alcohol/acetaldehyde based chemicals including ethylene oxide, diethyl oxalate, ethyl amines and propionic acid. For the production

of hydrogen peroxide may be available. Du Pont, USA has developed a new liquid phase process in which hydrogen and oxygen are combined directly, avoiding quinone-bed operations and solvents. It is claimed that this process reduces the capital cost by 50% of the existing process. Using this process it would be possible to construct relatively small plants. With emphasis on safe, clean and strong oxidising agents particularly suitable for effluent treatment, the requirement of hydrogen peroxide is expected to go up. There is scope of setting up a project for the manufacture of halogenated hydrocarbons including bromochloro/bromofluoro methane which are used as fire fighting agents in advanced countries. The potential demand of these products shall be in several sectors including ONGC, Post & Telegraph, power plants, electrical sub-stations, civil aviation, refineries and petrochemical complexes.

The country has sufficient capacity for the manufacture of acetone produced from molasses and also as by-product from phenol production. Acetone based chemicals including MIBK and 3,5 xylenol could be considered. There also appears to be scope for setting up facilities for the manufacture of adipic acid, based on cyclohexanol which is being produced as an intermediate in the production of caprolactam. A project for nylon-6 manufacture also merits consideration. With an integrated approach, large cultivation of castor seeds could be converted to high value added chemicals. With the large availability of gas and continued increasing imports of crude oil, carbonylation chemistry can supplement the petrochemical industry. Synthesis gas can be used as a building block for a host of products. Gujarat has no commercial coal deposits. However, it has large reserves of deep coal which cannot be exploited by traditional mining practices being employed at present. The thickness of coal seams vary from 5 to 10 mts. and depth varies from 1 km. to 1.8 kms. Underground coal gassification offers a possible way of commercial exploitation of these deposits in the foreseeable future. Besides power generation, this may also offer synthesis gas for production of several petrochemicals.

Our country's petroleum refining needs are estimated at 75 million tonnes by the end of Eighth Five Year Plan against a present production capacity of 50 million tonnes. Even after the two planned refineries and expansion of some, there shall be a gap of 16 million tonnes. Gandhar area in Bharuch district where large oil deposits are found offers a good location for a grass-root refinery. This shall create further avenues for a host of downstream units. The production of middle distillates from gas using methanol route merits consideration in Bharuch district. The development of technology for the production of ethylene glycol by oxidative coupling of carbon monoxide in presence of alcohol is more relevant for a country like ours. With more stringent regulations on hazardous substances, continued efforts shall be made in developing alternate, safe processes which can avoid the usage hazardous raw materials/production of hazardous interm iates. New catalysts shall be developed which are very sel tive whereby by-products/side products are reduced. Synth gas can be converted to methyl formate which can be furt oxidised to dimethyl carbonate. On chlorination this co be converted to trichloromethyl chloroformate (di-phosge which is safe and can be readily converted to phosg required for any reactions. The production of two of the la volume phosgene based products viz. MDI and polycar nates is increasing world-over. Though these products being talked of for indigenous production, no concrete st are taken for immediate implementation. With the exp ence in producing and safely handling phosgene and c sidering the versatility of MDI and polycarbonates, Guj offers an ideal location for such large scale world-size p jects. Polyurethane systems have a bright future.

Sulphamethoxazole is a widely used antibacterial drug which there is a large indigenous as well as export mar As an intermediate of sulphamethoxazole, diethyl oxa offers good opportunities besides exports. Oxalic acid b on sugar could also be considered on a large scale. The e ing plant of manufacturing methyl methacrylate uses hy cyanic acid as feedstock. An alternate process develope Japanese uses isobutylene as the basic feedstock which is toxic. There is also potential for setting up project for manufacture of acrylates including butyl and ethyl. Some ciality chemicals including photo-copier chemicals, oil chemicals, polymer and rubber additives could be indigen

Considering the large demand of titanium dioxide for face coating substances and indigenous availability of basic inputs, it should be possible to set up such a large ject on a coastal location. A world size plant using the l technology which takes care of complete effluent treat may be considered. With the thrust on food processing in try, packaging industry has become attractive. Alongwith eral packaging materials including BOPP, polyester films multi-layer films, bioriented nylon films for food packa offers good scope. Considering the problems of dispos plastic packaging, the trend may be an increasing usa biodegradable polymers — bipolymers produced by m bial fermentation of agrobased feedstocks. These poly also help in controlled release of drugs, fertilisers and ticides.

Phosphogypsum is a by-product from some indus posing disposal problems. A technology is available wh gypsum is decomposed in two zone fluidized bed rea into sulphur dioxide and calcium oxide. Sulphur dioxide taining gas can be used for oleum/sulphuric acid man ture and sintered solid by-product can find application as aggregate. Sodium hydrosulphite also offers good pot

h for indigenous and export market. With the rapid develment of the electronics industry and thrust on phase-wise igenisation of basic components, electronics chemicals ich are ultra high purity chemicals offer good potential. ese are low volume high value products. Further, process of engineering plastics for applications in electronics has reat potential. This business could be as much as 10-15% total electronics business estimated at Rs. 10,000 crores.

A large petrochemical complex is recently cleared for zira. Based on several products of this complex, a large mber of downstream units shall have good potential. rther, scope exists for several industrial units to cater to needs of this complex including speciality chemicals and ckaging materials. Another emerging area is alloys, blends, npounds and composites of polymers and elastomers. This a specialised field involving high technology in which procts are tailor-made for different applications including placement of energy intensive metals. Fibre reinforced plass have not grown much in our country. With the easy availility of basic inputs like phenol, formaldehyde and lyester resins there should be good scope of thermosetting stics; this would require concerted efforts on the lines of rmoplastics.

As octane booster of motor spirit, MTBE is used worlder. There is no facility for the production of MTBE in our country. We may also consider production of ETBE from ethanol and isobutylene. ETBE has a higher octane number and a lower vapour pressure compared to MTBE. In our country, sugar is very popular becase of its low price. With thrust on food processing industry and calorie consciousness of people, there is a scope for high fructose corn syrup (HFCS), catering to a specific market segment. One estimate indicates demand figure of HFCS at 200,000 tpa in the country. An integrated complex producing HFCS and other by-products based on maize as feedstock may be planned in north Gujarat.

In addition to investment, NRIs may be a potential source of new products and new processes. One emerging such field in which NRIs can contribute is biotechnology. The production of synthetic insulin is emerging as one of the successful biotech ventures. Similarly, many pharmaceutical products viz. biodiagnostics, biotherapeutics for cancer and vaccines are the biotechnology based future products. With more than 30% share in country's bulk drugs production, Gujarat can continue to lead by going in for new generation drugs. Entrepreneurial skills of Gujarat when combined with technological innovations can do wonders in the industrial development of the State. Liberalised policies of Government of India, minimum economic size capacities and broad banding of several products added to the pragmatic policies of Government of Gujarat are conducive to the further growth of chemical and allied industries in Gujarat.

Our innovation for Your convenience

KARL FISCHER REAGENT in a single solution 500 ml.

NOW NO MORE HASSLES OF PREMIXING 'A' & 'B' SOLUTION FOR YOUR ANALYTICAL WORK

Innovations as a result of Research and Development work in BDH is a continuous process. Karl Fischer in single solution is one such example of our unending efforts to offer new and improved products in the service of the Scientific Community.

Now you have no reason to settle for anything less

BDH THE NAME YOU HAVE LEARNT TO TRUST

PRODUCT OF ESTABLISHED STANDARD KNOWN THE WORLD OVER

For further details please contact
E. Merck (India) Limited
Shiv Sagar Estate 'A', Dr. Annie Besant Road,
Worli, Bombay — 400 018

News from the American Market

EPA DATABASE DETAILS SOURCES OF TOXIC RELEASES

The Environment Protection Agency (EPA) recently released a computer database of the chemical release reports collected in 1988 under its Toxics Release Inventory (TRI) programme. The database enables the public to have access to more than 19,000 manufacturing facilities, through the use of personal computers. The new database contains the first comprehensive emission information on specific facilities and communities available through EPA.

Also it identifies 25 countries with the largest total releases of toxic chemicals, contributing about 52% of total releases in the US. The EPA analysis shows that the chemicals and allied products sector was responsible for more toxic releases and transfers than any other industry contributing quantity of 12.1 billion pounds of chemicals. It released about half of such substance to surface water and 24% to underground injection.

The Natural Resources Defence Council (Washington, DC) issued its own analysis of TRI data. The NRDC lists 1,500 major sources of 11 cancer-causing chemicals, ranking the 20 largest emission sources for each of the chemicals.

The increasingly accessible information means the chemical industry is going to have to spend a great deal of time in explaining to the public the relevance of such data.

POLYMER DEMAND SLOWS

PE prices have plummeted nearly 10 cents/lb this year, whereas ethylene contract prices started to weaken only in May slipping 2 cents/lb. Commodity-grade PE resin prices range from 43 cents/lb for linear low-density PE to 47 cents/lb. Ethylene producers hope that quantum shutdown, and the scheduled plant turn-arounds would supply enough psychological support to present ethylene prices slipping further.

However, third-quarter 1989, is predicted to be the strongest in terms of demand, according to a PE major. Buyers would soon realize ethylene prices would drop — but gradually.

Preliminary 1989 statistics of the Society of the Plastics industry show the first five months' production about even with the same period of last year, but sales of linear low-density and low density PE were off 8%. Besides the fall-off in buying by India, Pakistan and China last fall caused polymer prices to nosedive.

More recently US PP producers have lost export business to foreign producers eager to expand existing capacity. In May PP prices dropped from the mid-40s to the low-40s for general purpose homopolymer.

As regards PVC prices Occidental Chemical lowered its list prices by 2 c/lb on June 1, and other producers to match the move, listed film PVC of 44 c/lb, general purpose at 43 c/lb, and pipe-gra at 42 c/lb.

The 2 c/lb drop in ethylene ces has given — some relief feedstock costs to makers of vi chloride mohomer (VCM) and directly to PVC producers.

Styrene price cuts of 2 cents in June take pressure off PS sins makers. Prices for some grades dropped a penny in Ju but producers say decreases not being made across the bo With the exception of extrus custom sheet, PS demand in h ing up and the 3 cents/lb p differential between high-imp and crystal PS has not deteri ted.

'SUPER FUND' PROGRAMME TONED UP

The Superfund hazardous w clean-up programme has rece released a study ordered by liam K. Reilly — the current administrator in the United Sta

The study recommends f participation by the public in gramme decisions prioritised mination of acute health and s ty threats from sites, more co tent site remedy decisions b management and stepped-up search on new clean-up techn gies in Reilly had already pled to shift to an "enforcement f policy against responsible par

Under the new enforcemen licy the objective would be to the parties responsible for the tamination to do the clean-u ther than clean-up sites with f ral funds and then seek rein sement.

PA plans to check 200 unas-sed sites to ensure that no im-ent health threat exists. Then agency would conduct clean-work at the highest priority s first. Management will be roved by drawing in new per-nel and using a new system match best available tools to edy the problem, regardless of ther the site is cleaned by the ernment or private agencies.

EPA will also remove barriers ell use of settlement incentives vided by the law like nonbind-allocations of responsibility, ked funding and minimum set-ments for small contributors.

The report says guidelines must drawn up to stop the improper of contractors, reflected in the ort's directive to increase in-use staff and reduce dependen-on contractors.

The report urges better consist-y between EPA regions in re-dy decisions in compliance h statutory mandates and nsideration of data about ilable clean-up technolo-s. But it also adds solute consistency is not a rea-nable expectation given that ndreds of waste sites differ in ny respects and that the law quires consideration of several tors that often militate against nsistency.

The U.S. superfund programme a long-term clean-up effort that ll continue into the next cen-y.

O_2 PROJECTS ON THE CREASE

H_2O_2 projects are coming up st with Sweden's Ehc-Nobel in joint venture with Du Pont and itsubishi Gas Chemical planning ant in Venezuela, and the Fren-owned Oxychem Canada doub-g up capacity in Quebec to 40,-00 m.t./year. H_2O_2 projects grow by 15-18% per year in N. Ameri-ca. But producers now want a worldwide position in this pro-duct.

The driving force behind the upsurge is the start-up of more chemi-thermomechanical pulping (CTMP) process mill. Oxychem expects the Canadian market to grow from 30,000 m.t. last year to atleast 50,000 m.t./year on 1992.

North America is likely to at-tract still more investment, and promising but smaller markets exist in Mexico, Malaysia, South Africa, Chile or Pakistan, Besides peroxide projects have exhibited the tendency to generate demand once local production is estabi-shed.

BRAZIL TO BUILD NEW CHLOR-ALKALI COMPLEX

A plan to build a 81-billion petrochemical complex was laun-ched by Brazil in the state of Sergipe, recently. The launch represents an important move to decentralize Brazil's industrial ac-tivity.

Most of the basic plants are expected to start up in 1992-93. Among there is a $350-million chlor-alkali complex with annual capacities of 200,000 m.t. of Caustic Soda, 180,000 m.t. of Chlorine, and 80,000 m.t. of ethylene dichloride (EDC). Chlo-rine and ethylene feedstock will eventually come from its own cracker, to be built by Salgema Industries Quimicas, SA supple-mented by ethylene from the already existing Camacari Petro-chemical complex.

Another project on the anvil is a 200,000 mt/year ethylene plant using ethane on feedstock. A $120-million natural gas treat-ment plant will also be included in the project; to be built by Pe-trobras. It will supply the feed-stock for an ethane cracker, and an expanding fertilizer facility, run by one of the company's sub-sidiaries. This plant will increase Sergipe's gas treatment capacity from 3 million cu-metres/day of nitrogen to 7 million cu-metres/day.

About $100 million will be in-verted in port facilities, primarily for exports. Brazil is asking for a $100 million from the Inter-american Development Bank (IDB) banks abroad.

SODA ASH OUTPUT HITS ALL TIME HIGH

Soda ash in May hit record levels of 879.533-s.t while inven-tory stocks for the month reached 194,476 s.t according let figures released by the U.S. Bureau of Mines. A key factor in the out put drive is the export market where exports, have climbed to levels above those in the U.S.

Tenneco and Texasgulf operate at name-plate capacity, with the former scheduled to increase pro-duction by 100,000 s.t/year by 1990 on account of debottle-necking.

General Chemical will also be expanding capacity at its Wyo-mingtrona site. The debottlene-cking project will increase cur-rent name-plate capacity from 2.2 million lbs/year to 2.5 million lbs/years during the next few years. An increase in demand and the continued demand for liquid caustic product played a major role in the planned expansion.

A breakdown of export prices shows the varying levels for soda ash product throughout the world (through April 1989): Canada $66.05/s.t. Venezuela $127.65; Sweden $110.67 (purchased 8,-775 s.t.), England $147.21 (pur-chased 17,000 s.t.). France $93.44 (purchased 5,300 s.t.) Chiha $ 110.16 (purchased 191,-520 s.t.); Australia $99.80.

FOR REQUIREMENTS OF CHEMICALS & PHARMACEUTICALS

READY

BETA NAPHTHOL
LUVISKOL K 30
EPICHLOROHYDRIN
DI METHYL FORMAMIDE
N PROPANOL
HYFLOSUPERCEL
META PHENYLENE DIAMINE
PHENYL HYDRAZINE AND ITS SALTS
MONO SODIUM GLUTAMATE
CALCIUM CARBONATE
LACTOSE (CCF)
PEPSIN 1:3000
SORBITOL 70%
THEOPHYLINE BP (W. GERMAN)
FERROUS FUMERATE IP
PARA TOLUENE SULPHON-AMIDE (M.P. 135°C-137°C)
ORTHO TOLUENE SULPHON-AMIDE (M.P. 151°C-154°C)

UNDER CLEARANCE

CRUDE NAPHTHALENE C.P. 78.2°C
POTASSIUM PERMANGANATE (CRYSTALS B.P.)
L LYSINE -- FEED GRADE
DL METHIONINE -- FEED GRADE

INCOMING

PECTIN
LEVAMISOLE
MANNITOL (BRAZIL)

Contact:

United Chemicals

190, Mangaldas Bldg. No. 3B,
Mangaldas Road,
Bombay-400 002.
Tel.: 315368/256433/255127
Tlx.: 011 - 5235 UNIT IN

For Your Requirements Of:

LIGHT MAGNESIUM CARBONAT

Manufactured By

M/s. GUJARAT CHEMICAL INDUSTRIE

B-4, Selarka Sadan, Dr. M.P. Vaidya Marg,
Ghatkopar (East), Bombay-400 077.
Factory: Bhavnagar

Authorised Dealer

VENUS CHEMICAL INDUSTRIES

404, Khajurwala Chambers, 313/315, Narsi Natha Street,
Bombay-400 009.
Phones: Office: 343473/332796 Resi.: 5600648/5603697

YEAST EXTRACT PASTE AND POWDEI

Yeast Extract is an excellent source of Protein, B-Vitamins and essential Amino Acids.

Yeast Extract can be effectively used as nutrient and flavour carrier in items such as: Medicated tonics • Soups, processed snacks and savouries • Dietary preparations • Baby food.

Yeast Extract is most suitable for inclusion in microbial growth media for diagnostic and fermentation purposes.

TYPICAL ANALYSIS OF YEAST EXTRACT

Contents	Unit	VALUE YE Paste (High Salt)	YE Paste (Low Salt)	Pow
Dry Matter	%	71.0	71.0	9
Amino Nitrogen	%	3.5	4.2	
Total Protein	%	43.0	55.0	7
Water Solution	5%	Clear	Clear	C
Copper	mg/100 gm.		11.0	1
Iron	mg/100 gm.		18.0	2
Vitamins				
B1	mcg/g	40.0	53.0	
B2	mcg/g	25.0	38.0	
B6	mcg/g	15.0	16.5	
Pantothenic Acid	mcg/g	80.0	112.8	14
Niacine	mcg/g	150.0	236.8	3

THE INDIAN YEAST CO. LTD.

Bombay: 3, Walchand Hirachand Marg, Pin 400 038. Tel: 263643/267721
New Delhi: Gulab Bhawan, 6 Bahadur Shah Zafar Marg, Pin 110 001. Tel: 3317732
Madras: 166 Thambu Chetty Street, Pin 600 001. Tel.: 589021
Calcutta: 4 Bankshall Street, Pin 700 001. Tel.: 289151/285601.

Distributors/Agents interested in bulk quantities may also get in touch.

News from Abroad

ENIMONT NEGOTIATES SAUDI PROPYLENE PLANT

Enimont, the newly formed joint venture between Enichem and Montedison, is forging ahead with plans for rapid internationalization. In Belgium recently to announce the commissioning of major new polystyrene production facilities, Lorenzo Necci, president of Enimont, outlined the company's strategy for the future, and talked about the impending flotation programme and Enimont's links with Orkem.

Necci revealed that Enimont has begun discussions with Sabic on the formation of a propylene production joint venture in Saudi Arabia.

In his keynote address, Necci spoke of a three-point plan for Enimont: internationalization; rationalization; and innovation. "Internationalization means not just selling worldwide. We already market almost half of our total volume outside Italy. Internationalization today also means being close to the customer. This implies a shift in the balance of our production. Currently about 15 per cent of our production is manufactured outside Italy. We intend to move that to 40 per cent", the president said.

Enimont is selectively pursuing port-folio swaps, acquisitions and joint ventures where it already has technological and market strength. The polystyrene expansion at Feluy and the newly signed agreement with Orkem to acquire control of the linear and low density polyethylene and the ethylene cracker at Dunkirk are a logical reinforcement of Enimont's integration. Together with its existing PE plant at Oberhausen in Germany and the elastomer production in the UK, they strengthen the company's leadership and bring it closer to the customers.

Enimont is buying 100 per cent of Orkem's PE operations and 60 per cent of the cracker, Orkem's current total share in the plant. It is not yet certain how the remaining 40 per cent, now held by Qatar but which is being transferred to Orkem, will be divided. Part of the ethylene, Necci said, will be used to feed the Oberhausen plant in Germany and there are also plans for the cracker's expansion as well as new downstream development. The total package will be worked out by the end of December.

Co-products from the ethylene plant at Dunkirk will provide raw material both for the Belgian PS expansion as well as it's UK elastomer plants.

Enimont is the first Italian national company with the power to compete on the world stage, Necci said. It has assets of L9,500bn ($7bn) and sales this year are expected to reach L16,000bn ($11 bn). Asked whether the company will downgrade its L1,100bn profit forecast for this year in view of the decline in the heavy chemical markets, Necci said for forecast will not be altered. As an integrated company it has the means for overcoming the problems. "The fall in prices has been so rapid that there is something wrong, may be the Chinese situation had something to do with it, in my opinion there will be a recovery".

The flotation of 20 per cent — 10.5 per cent in Italy and 9.5 per cent outside — of the company's shares is scheduled for September 10-15.

Referring to talks with Snia o port-folio swaps — Enimont's n lon for Snia's acrylic — Nec said that the fibre industry is fa ing major rationalization and "w would not play a part if we do rationalize in Italy". Talks wi Snia have not progressed beyo the letter of intent, which the tw signed in April.

On plans by Sabic to set manufacturing joint ventures Europe, Necci said that his co pany could be interested in a pa nership but it would depend what Sabic had to offer. Althou there are no discussions on t front, Necci said preliminary ta have begun with Sabic on the s ting up of a propylene produc joint venture in Saudi Arabia. " are looking at expanding wh feedstocks are available", said. No other partners are olved. Eni is already a partne 1bn Zahr, an MTBE produc joint venture, which also inclu Neste.

Polystyrene is an area wh Enimont's internationalization particularly in evidence. Its t capacity of 475,000 ton/year, cluding expanded polystyr puts the company in Europe's cond slot after BASF and give 18 per cent of the market.

Two new production lines h just been commissioned by F mont, Enimont's joint venture Petrofina (Enimont is respons for the marketing) at Feluy, gium, adding 35,000 ton/yea crystal polystyrene and 10 ton/year of compounding to existing facilities of 75,000 year of impact PS and 35 ton/year of EPS. Its total Bel operation now commands 1 000 ton/yr. of capacity. Previ Northern European customers crystal and compound polysty were supplied from the 320 ton/year plant at Matova in n ern Italy.

Chemical Markets Abroad

RAXYLENE ,DEMAND TO CW INTO THE 1990S

A paraxylene growth rate of 6 cent is sustainable over the t decade despite the apparent wdown in the global economy ected for the first two years the 1990s, according to Paul le, senior analyst at Petroche- al Consultants International. s follows 9.4 per cent com- nd growth for paraxylene sin- the bottom of the economic p in 1982.

The global supply and demand ation for the third and fourth ters this year are balanced, h the current excess of pro- t, mainly in Japanese tanks, ected to progressively disap- r as new PTA capacity in Tai- and Korea takes it up in July- tember.

However, xylenes prices in the are under pressure in July ch could affect paraxylene tract prices. US paraxylene es may have to react to the er prices set in Europe albeit h an exchange rate distortion.

remains to be seen how the axylene market will react to new Japanese paraxylene is debottlenecks as well as two new Korean units, but, as ory has shown, paraxylene gins could decline by 1991 to els below reinvestment econo- s if all this new capacity nes into the system.

here is a case for spreading some of this new capacity by aying start-ups where possible a year or two, but according Beale, at least another 1.5m ton new paraxylene capacity will required by the late 1990s.

Around seven million ton of capacity is expected to come onstream over the next decade, which will effectively double the present world capacity. A major part of this is to be built in Asia and the Far East in the next few years. Japanese paraxylene capacity alone is set to double from its 1988 level.

The world production base for paraxylene is inexorably shifting away from North America, on the basis that the greatest concentration of new PTA capacity will centre in the Far East, to fuel high indigenous growth in demand for polyester products.

Feedstock to service the new paraxylene production in the Far East will largely come from new reforming capacity, crude distillation capacity and additional extraction capacity from the refinery systems in the Far East. In Europe and North America, paraxylene producers will utilise xylenes already within the gasoline pool by using alternative octane blend components, changing severity of reforming capacity improving catalysts or by consuming merchant xylenes currently allocated to the export markets.

This demand for paraxylenes may be justified by the increased demand for fibres. Beale forecasts a global increase in fibres demand of around 15m ton by the year 2000 of which 40 per cent will be polyester.

Despite almost 6m ton of new consumption of polyester fibre in Asia and the Far East, consumption will only have doubled to 2.5 kg **per capita** by the late 1990s compared to consumption in North America of around 7.4 kg **per capita**.

For the feedstock side, depending on relative economics and supply and demand, selective toluene disproportionation (TDP) may become far more widespread, feedstock for paraxylene and will encompass the total toluene/xylene pool. Thus bringing the price, at a premium on gasoline blend values.

Looking at the recent history of paraxylene production, capacity utilization rates throughout the 1980s have steadily increased from around 80 per cent to virtually optimum, with production rates which can vary between 85-95 per cent.

FRENCH CHEMICALS OUTPUT UP

France's base organic chemicals sector experienced a record year in 1988, with utilization rates of steam crackers exceeding 100 per cent in a number of cases. Union des Chambres Syndicales de l'industrue du Petrole, the oil firms trade group, has revealed that steam-cracker profitability was only attained at the year end.

After the sharp recovery of 6.1 per cent growth in 1987, olefins production only rose 4.6 per cent in 1988, although record levels of 4.5m ton were reached. Lifited by cracker capacity, ethylene production only increased 1.6 per cent in 1988 but also reached recovered levels exceeding 2.4m ton.

Propylene production reached 1.5m ton for the first time with consumption at 1.3m ton. The accelerated production increases of 7.3 per cent in 1988, compared with 6.8 per cent in 1987, is mainly due to polypropylene development.

The export balance of ethylene and propylene — traditionally positive — deteriorated in 1988 with 226,000 ton of ethylene exported down from 280,000 ton in 1987, and 189,000 ton compared with 286,000 ton for propylene.

NEWS FROM JAPAN

MINIUM SYNTHETIC RESIN CREASINGLY APPLIED TO RS

Japan Automobile Manufactur- Association has announced results of a survey on compo- t ratios of raw materials for inary- and small-sized passen- cars manufactured in 1988.

The association selected 20 dels of mass-produced cars ~2,000 cc) including those mercialized last fall as main- items and calculated — on a ghted-average basis — the ume of raw materials needed manufacturing them.

The survey results show that component ratios of non-ferro- metal, in particular aluminium, synthetic resin are rising and e is a definite move toward ufacturing lightweight, high- ormance cars.

According to the latest survey, ratio of cold-rolled thin steel e — which commands the lar- share in ordinary steel used car production — dropped siderably. In contrast, zinc- ed steel plated and other sur- e-treated ones are being in- singly employed in a bid to ance the corrosion resistance he car body and lengthen car e.

With regard to specialty steel erials, use of steel alloy and e-cutting steel has increased ce they help automate assemb- ines and improve working effi- cy.

n nonferrous metals, the com- ent ratios of electrolytic cop- per and aluminum have risen sharply in response to the progress of car electronics and increased application of aluminum ingot and aluminum alloy to wheels and exterior panels, respectively.

A similar survey is conducted by the association every three years. It is unreasonable to make a simple comparison between raw material ratios obtained through a certain survey and those derived from another one since there is a difference in the car models surveyed.

The share of synthetic resin has increased every time the survey has been conducted. Polypropylene has been applied to many parts — interior panels and bumpers, etc. — in the form of polymer alloy and modified resin. High-performance resins such as polybutyrene-terephthalate resin, nylon and polycarbonate resin have come to play an important role in car-part manufacture.

Demand for synthetic resins is growing in the Japanese car industry since they are completely free from corrosion and allow freedom in designing car parts. Their application is steadily expanding from interior material to engine-related parts and exterior panels.

Component Ratios of Raw Materials for Passenger Cars (in %)

	1983	1986	1989
Pig iron			
Ordinary steel	2.2	1.7	1.7
Bar steel	0.9	0.9	0.8
Hot rolled thin plate	7.6	7.1	6.3
Hot rolled medium plate	5.7	4.7	4.8
Hot rolled thick plate	0.6	0.4	0.4
Cold rolled thin plate	29.4	26.0	22.5
High-tension steel	4.1	7.3	6.4
Galvanized steel	5.5	5.4	10.0
Other types of surface-treated iron sheet	2.3	2.8	2.9
Steel pipes	2.3	2.7	2.4
Others	1.1	0.4	0.4
Subtotal	59.5	57.7	56.9
Specialty steel		6.1	6.0
Carbon steel	6.0		
Alloy steel	3.6	3.4	3.5
Machinability-improved steel	1.0	1.4	1.9
Stainless steel, heat-resistant steel	0.9	1.0	1.0
Spring steel	1.5	1.5	1.4
Bearing steel	0.9	0.9	0.7
Others	0.4	0.7	0.6
Subtotal	14.3	15.0	15.1
Nonferrous metal			
Electrolytic copper	0.9	1.0	1.3
Lead	0.6	0.6	0.6
Zinc	0.4	0.4	0.4
Aluminum	3.5	3.9	4.9
Others	0.2	0.2	0.2
Subtotal	5.6	6.1	7.4
Nonmetal			
Paints	1.7	1.7	1.4
Rubber	3.5	3.0	2.7
Glass	3.2	3.3	3.0
Phenol resin	0.2	0.1	0.1
Polyurethane resin	0.9	1.2	1.0
Vinyl chloride resin	1.7	1.7	1.6
Polyethylene resin	0.4	0.5	0.4
Polypropylene resin	1.2	2.0	2.4
ABS resin	0.5	0.7	0.8
Versatile resins, subtotal	5.5	6.6	6.6
High-performance resins, subtotal	0.2	0.7	0.9
Synthetic resins, subtotal	5.7	7.3	7.5
Fibre	1.3	1.4	1.2
Wood	0.3	0.5	0.4
Others	2.7	2.3	2.7
Subtotal	18.4	19.5	18.9
Grand total	100.0	100.0	100.0
Total weight of raw materials (1973-100)	102.7	106.8	115.1

SANDOZ SUBSIDIARY TO SET UP DRUG RESEARCH INSTITUTE IN JAPAN

Sandoz Pharmaceuticals Ltd. Sandoz (Switzerland)'s Japan subsidiary — plans to compl in 1991 or 1992 an integrated search institute for drugs (t floor space: 15,000 m2) in T kuba Academic New Town lo ed in Ibaraki Prefecture, wh lies northeast of Tokyo. Constr tion is scheduled to be inangu ed next year.

The planned institute will co uct R&D work for drugs desig to meet Japanese demand for dical treatment, encourage m eting of Sandoz drugs in Ja and promote co-operation topnotch Japanese researchers the initial stage, it will back other Sandoz group firms with gard to their development of drugs. It will simultaneously p forward basic research.

The Sandoz group has deci to set up the research institut Japan, considering that busi expansion in the country calls prompt commercialization of drugs capable of meeting cive fied consumer needs for med treatment and the greying of s ety.

Sandoz Pharmaceuticals alre has two laboratories in Japan. search functions will be shi from these two labs to the institute, which will be sta with roughly 150 research more than double the present of some 70 researchers.

Sandoz Pharmaceuticals' an sales last year stood at Y76, million, up 3.1% over the pr ding year; the figure accounts 11% of the Sandoz group's c bined drug sales reaching 4. million Swiss francs last yea

GE BUILDUP OF ACRYLIC D MARKET UNDER WAY

crylic acid is the leading pro- t of Nippon Shokubai Kagaku yo Co. Ltd., which aims to ex- d the product's current annual duction capacity of 90,000 s to 150,000 tons by next year. company announced that it nned to increase production of ylic acid by 60,000 tons, and it would invest Y6 billion to ieve this goal.

The company must increase duction to meet the rapidly in- asing demand for high water orbent resin and cleanser buil- s. Just last spring in 1988, it up a system for producing 000 tons of the product and her increased production is ected to attract interest at ne and abroad. Once this aim been completed, Nippon Sho- ai will be the world's fourth jest producer of acrylic acid, king with BASF (W. Germa- , Rohm & Haas (US), etc.

apan's total output of acrylic d for 1988 came to approxi- tely 210,000 tons. This figure s tallied up from the 90,000 s of acrylic acid produced by pon Shokubai, 50,000 tons by Mitsubishi Petrochemical Co., 37,500 tons by Sumitomo Chemical Co., and 30,000 tons by Toagosei Chemical Industry Co. There has also been rapid growth in demand for acrylic acid ester, high water adsorbent resin, cleanser builders, and dispersants, all of which are used in house paints and other products. This area, in particular, is enjoying a favourable trend. Demand for these products have reached 200,000 tons (including exports). The year 1989 has already witnessed an increase, and demand is expected to hit the 210,000 ton level.

Nippon Shokubai invested approximately Y1,500 million in acrylic acid production in the spring of 1988, and increased the annual output capacity at that time (60,000 tons) by 30,000 tons, thus establishing a system able to produce 90,000 tons. However, demand for high water adsorbent resins is expected to grow by over 10% in light of diffusion rate of disposable diapers in Japan, which has already reached the 20% level. In addition, the demand for housing-related demand for acrylic acid esters, except methyl products, is expected to grow by over 5% annually. To cope with such rapidly increasing demands, the company decided to boost its annual production output capacity to 150,000 tons.

However, Nippon Shokubai's facilities include its current 40,000-ton plant, which is run on an old system begun in 1972. Consequently, while using this plant as a buffer, the company intends within the next two or three years to changeover completely to a new plant run via a propylene direct oxidation method in order to boost production efficiency.

S'TOMO CHEM TO RAISE ANILINE CAPACITY TO 80,~100,000 T/Y

Sumitomo Chemical Co. will expand its production capacity for aniline, demand for which has been growing rapidly in Japan and abroad as material for polyurethane and diphenylmethane diisocyanate (MDI).

The company will invest nearly Y1 billion in debottlenecking the 50,000-t/y aniline plant at its Tmime factory to raise capacity to between 80,000 and 100,000 t/y. The expansion work will be finished by the end of this year. This will make Sumitomo Chemical comparable, in terms of supply

capacity, with the world's major aniline makers such as Bayer, ICI and First Chemical.

The Japanese company explains that the capacity expansion is intended to meet demand growth stemming from the planned scale-up of MDI capacity by Sumitomo Bayer Urethane Co. a Sumitomo-group company — as well as increasing demand for use in dyes, organic rubber chemicals and drug intermediates, etc., and expected MDI expansion in South Korea and China.

Japan's aniline production last year totaled about 136,000 tons, which is broken down, by use, into 95,000 tons for MDI, 15,000 tons for organic rubber chemicals, 25,000 tons for dyes, pigments and drug intermediates, etc., and 10,000 tons for export. Import registered 10,000 tons.

The nominal capacities of Japanese aniline makers are: Sumitomo Chemical, 50,000 t/y; Mitsui Petrochemical Industries, 45,000 t/y; New Japan Chemical, 18,000 t/y; Mitsui Toatsu Chemicals, 23,000 t/y for in-house consumption; and Nippon Polyurethane, 5,000 t/y. This means that the supply-and-demand position is tight. Taking into account MDI-expansion plants in Japan and abroad, many believe that a substantial supply shortage of aniline is inevitable.

SALES IN JAPAN OF "K RESIN" SEEN HITTING 10,000 TONS

"K Resin" butadiene-styrene resin has been in short supply in Japan where there is growing demand for its use in resin modifiers. The product has been imported from Phillips Petroleum (US) via Nippon Steel Chemical.

Annual sales of the product in Japan stand at 6,000 tons but potential demand here is projected to exceed 10,000 tons a year. The Japanese company will be able to obtain from next year roughly 10,000 tons a year of the product for domestic sales since the US company is scheduled to scale up this fall the production concerned by 50,000 tons a year in the States and by 20,~30,000 tons a year in Europe.

The Japanese firm envisages starting to produce the said resin by itself when annual sales of the product reach 10,000 tons.

ELI LILLY SUBSIDIARY STARTS MARKETING HUMAN-GROWTH HORMONE

Eli Lilly Japan K.K. — subsidiary of Eli Lilly and Company (US) — has inaugurated marketing of "Humatrope" human-growth hormone (common name: somatropin) using roughly 200 professional service representatives. This is the first instance of the company selling a drug by itself.

The human-growth hormone concerned has been developed the US parent company using combinant-DNA technology a has already been marketed in countries throughout the world.

The Japanese subsidiary tained import approval on the p duct February 28 and it was lis on the drug tariff April 21. T company claims the drug is high purity, produces less antibody within the human bo shows a high degree of safety a markedly encourages hu growth.

The company was establis in November, 1975 and enga in licensing operations in the

stage. Since 1985 it has n promoting on a few drugs close co-operation with Shiono- & Co.

Start-up of independent drug rketing by the foreign-affiliated mpany indicates that it is pay- close attention to the potenti- ty of the Japanese drug mar- t. The firm plans to expand oduct offerings and build up a les network covering hospitals ated across the country.

AMASA ALLOWS SQUIBB (US) MARKET ANTIVIRAL GENT

Yamasa Shoyu Co. and Squibb rp. (US) have signed an agree- ent giving the US drug maker clusive world-wide marketing hts outside of Japan for "BV- aU" antiviral agtnt.

"BV-araU" — originally synthe- ed by Yamasa's chemists — is nucleoside analogue antiviral ag- t showing potent activity, most tably against varicella-zoster vi- s. Squibb is investigating this ent for treatment of shingles erpes zoster) and cold sores erpes simplex) in accordance th an investigational new drug ND) application field last Febru- y with the U.S. Food and Drug dministration (FDA).

Singles is a difficult-to-treat, inful disease affecting, in parti- lar, elderly and immunocompro- ised patients. It is a recurring ndition which often leads to st-herpetic neuralgia — itself a inful condition. No effective al pharmaceutical agent exists r the treatment of this debilitat- g disease. It is estimated that ere are more than 1.5 million ses of singles attacks every ar in the United States and urope.

Clinical trials for this promising agent are expected to begin in the States and Europe in late 1989 and, if successful, the drug will be available in the mid-1990's. It will also be evaluated against varicella in immunocompromised patients as well as for effectiveness against other herpes viruses.

The antiviral market—in which "BV-araU" will compete—is projected to exceed $1 billion by the late 1990's.

Clinical trials for evaluating the product as an oral pharmaceutical agent against shingles are in progress in Japan in co-operation with Yamasa Shoyu and Nippon Shoji Kaisha Ltd.

SHOWA DENKO MOVES UP CONSTRUCTION OF PP PLANT

Showa Denko K.K. has set itself to building a 60,~70,000-t/y polypropylene (PP) plant at its Oita factory next year, one year earlier than originally planned. The company is running a 92,500-t/y PP plant but has been unable to meet brisk demand for the product itself.

It has supplied Honam Oil Refinery Co. (S. Korea) with propylene and received PP from the S. Korean company in return for the raw material supply. The imports from S. Korea, however, lack stability in terms of both product quality and quantity.

Showa Denko has agreed with Tonen Sekiyukagaku K.K. with regard to capacity expansion for PP: the latter is scheduled to complete a 60,000-/y PP plant at its Chiba factory next April.

Showa Denko is due to take delivery of roughly 15,000 t/y of the PP produced by Tonen Sekiyukagaku's new plant but the agreed-upon amount is not sufficient for satisfying the growing demand for the product. It is forecast that PP will attain the highest growth rate in Japan among general-purpose resins. Domestic PP production in 1988 increased by as much as 11% over the preceding year. It is expected to mark a 10% gain in the Jainary-June period of this year.

Showa Denko has decided to move up construction of its new PP plant, taking into account the above-mentioned circumstances surrounding PP operations. In a related development, it is also planning to erect a new L-LDPE plant at the Oita factory, keeping pace with the planned scaling-up of ethylene production to 750,000 t/y. The construction of PP and L-LDPE plants will build up the foundation of the company's petrochemical complex located in Oita, Kyushu.

JAPANESE ANTI-INFLAMMATORY DRUG LICENSED TO GERMANY

Nissan Chemical Industries Ltd. and Hisamitsu Pharmaceutical Co. have jointly licensed to Kali-Chemie Pharma of West Germany the production technology for an external-use (nonsteriodal) anti-inflammatory anaigesic jointly developed by the two Japanese firms. Kali-Chemie is the drug department of W. Germany's Kali-Duphar.

Under the agreement, the German firm manufacture and market the drug in the 12 EC countries. The external-use drug will be available in three forms — gel, lotion and cream.

The drug is being sold on the Japanese market under the "EPA-TEC gel" and "SECTOR gel" trade names.

New Developments from Japan

THICK HARD LAYER FORMED ON ALUMINUM SURFACE: SHODEN

Showa Denko K.K. (Shoden) has established technology for giving aluminum a hard surface layer surface of using a flame-spraying process for ceramics. The company has thus succeeded in forming a hard layer (fine-ceramic particles) with a thickness of more than 1mm upon the surface of aluminum. The R&D work concerned was conducted under commission from The Japan Research and Development Center for Metals (JRCM).

Ceramic powder employed for the said purpose is classified into two types — type (1) composite powder of tungsten carbide and cobalt (component ratio: 12%) and type (2) mixed powder of chromium carbide and nickel/chromium (25%). The two types of ceramic powder were flame-sprayed on 5000-type aluminum alloy comprising pure aluminum, magnesium and copper. The alloy was heated up to 200 deg C in advance and flame-spraying equipment manufactured by Stoody Deloro Stellite Inc. (US) was utilized.

The Vickers hardness of the type (1) and (2) powder-coated aluminum stands at 1,100 and 880, respectively. The two types of aluminum products are harder than anodized aluminum.

Aluminum surfaces are usually treated using an anodizing method but the hardened layer thereby formed is so thin that it can measured in microns. Anodiz aluminum cannot be utilized sliding parts for, for example, dustrial-use robots since the th hardened layer is easily peel off.

Ceramics-coated alumin test manufactured by Showa De ko can be applied to sliding pa and will help expand applicat fields for aluminum. The com ny claims it is necessary to de lop "gradient-function" mate aimed at improving the adhes between the hard layer and aluminum.

FIBRE AUXILIARIES MAKER PRODUCES DIAMOND POWD

Matsumoto Yushi-Seiyaku Japan's top textile-auxiliaries ker based in Osaka, has be mass-producing industrial use tificial diamond powder featu high purity. The diamond pow is produced from graphite means of a reaction brought at at high temperature and ur high pressure in the presence catalyst.

The company has built a p for the powder and is marke it for use as abrasive grain saw blades and wheels. This siness is part of the compa diversification into nonfiber-r ed products such as extre fine organic particles and ma tic fluids.

"NANO-CHEMISTRY" RESEARCH PROJECT TARGETED: MITI

MITI is scheduled to begin fiscal year a Y50 billion-w 12-year research project for no chemistry" aimed at con ing molecular arrangement chemistry is believed to hol key to the development of material and life-science pr tion.

he project is intended to esta- technology for controlling analyzing atomic/molecular ngements in the nanometer ,000,000 mm) order, thereby ding up the foundation of new nical technology.

line with the project, MITI s to install 1,000 million volt- s neutron beam-applied ana- s equipment and 2,000 million -class synchroton orbit radia- (SOR)-applied analysis equip- t and push forward related arch with the co-operation of government, industry and uni- ities. It aims at completing ted feasibility studies by the of fiscal 1991 and stepping elated operations after that.

is becoming increasingly ne- ary to establish technology controlling and analyzing ato- molecular arrangements, kee- pace with aggressive deve- ent of polymer alloy, super- uctors and biomimetics mate- etc. Application of X-ray/ tron diffraction analysis meth- now in use is limited to ana- /control of atomic/molecular ngements in the micron ord- They are unsuitable for ana- of biological supermolecules substances (ex. polymer al- having disordered atomic ar- ements. What is worse, con- ional methods are unable to tify arrangements of small s under the influence of tric fields and charges.

eutron beams and SOR have e to be actively applied to ctural analysis of substances control of atomic/molecular ngements in overseas. Japan owever, lagging behind these tries in nano-chemistry R&D elated equipment.

NEW CATALYST HELPS PRODUCE PHENOL IN SINGLE STEP

A research group led by Professor of Chemistry M. Seno of Institute of Industrial Science, the University of Tokyo has synthesized perfluorotetraphenyl porphyrin — a fluorinated porphyrin-iron complex — and succeeded in efficiently producing phenol from benzene and hydrogen peroxide in a single step using the complex as a catalyst at room temperature and under normal pressure.

The new complex is produced by replacing all the hydrogen atoms of tetraphenyl porphyrin with fluorine atoms. It features high-level stability against oxidants.

The research group has also confirmed that the complex serves as a catalyst for producing 1,4-benzoquinone and epoxychlorooctane from phenol and cyclooctene, respectively. It is regarded as a promising catalyst capable of activating the carbon-hydrogen bond.

Phenol is usually produced by means of a cumene process. The said complex facilitates a new economical process to synthesize phenol in a single step by directly oxidizing benzene.

Cytochrome P-450 also activates the carbon-hydrogen bond but is used only as an oxidative catalyst for olefin and alkane since it lacks stability against oxidants.

FAR MORE POWERFUL WEEDKILLER MADE BY USING FLUORINE GROUP

Sagami Chemical Research Center, Chisso Petrochemical Corp. and Kaken Pharmaceutical Co. have jointly succeeded in developing a herbicide having a very strong weedkilling effect — about ten times that of conventional ones.

The development has come about from successful introduction of a fluorine substituent to oxazolidinedione, a nitrogen-containing heterocyclic compound already developed as a herbicide. The new chemical has weedkilling efficiency of several tens grams per hectare.

A researcher involved commented on the chemical, saying that the problem is that it is rather too effective as a weed killer.

It has been known that the introduction of a fluorine substituent to existing herbicides would give them a greater weed-killing effect, and so there has been an active development race among many agrochemical makers throughout the world. It is also believed that replacement in an appropriate position with a fluorine substituent will not increase the degrees of toxicity of the host chemicals.

The researcher says that it has been confirmed that other oxazolidine-dione derivatives obtained by such substitution also have strong weed-killing effects.

R&D FOR 3-COMPONENT PHOTORESIST KICKED OFF: HOECHST JAPAN

Hoechst Japan Ltd. has inaugurated R&D work for photoresist adaptable to excimer lasers, X-rays and ion beams, all of which will be used in lithography employed for the manufacture of DRAM chips with a capacity of more than 64 megabits.

Hoechst — the company's parent firm located in W. Germany

— has already developed a 3-component photoresist in sample form: the new product consists of a base resin, sensitizer and inhibitor. The Japanese subsidiary intends to commercialize the product in co-operation with Japanese semiconductor makers.

Conventional photoresist is usually of 2-component type: it is composed of a base resin and sensitizer. Hoechst Japan, however, considers that 2-component products based on phenol resin are not suitable for ultraviolet rays and X-rays having wavelengths of less than 300nm.

High-density IC chips (capacity: over 64 MB) need to have circuit widths of as narrow as less than 0.25 micron. Excimer lasers, X-rays and ion beams (wavelength: 249 337nm in each case) will be used for engraving such fine patterns upon semiconductor chips.

Hoechst Japan plans to open a new laboratory in Kawagoe located north of Tokyo in September next year and promote photoresist R&D at the new laboratory equipped with synchrotron-orbit-radiation (SOR) equipment. Hoechst is considering moving the electronics divisions of its R&D bases spread throughout the world to the Japanese laboratory.

MITI SPONSORS R&D PROJECT FOR ORGANIC SILICON

MITI is scheduled to inaugurate next fiscal year an R&D project for organic silicon with the co-operation of the government, versities and private indu The project is aimed at deve ing excellent material — w has, for example, a high leve strength and thermal resistanc by combining silicon with nit en and oxygen, etc.

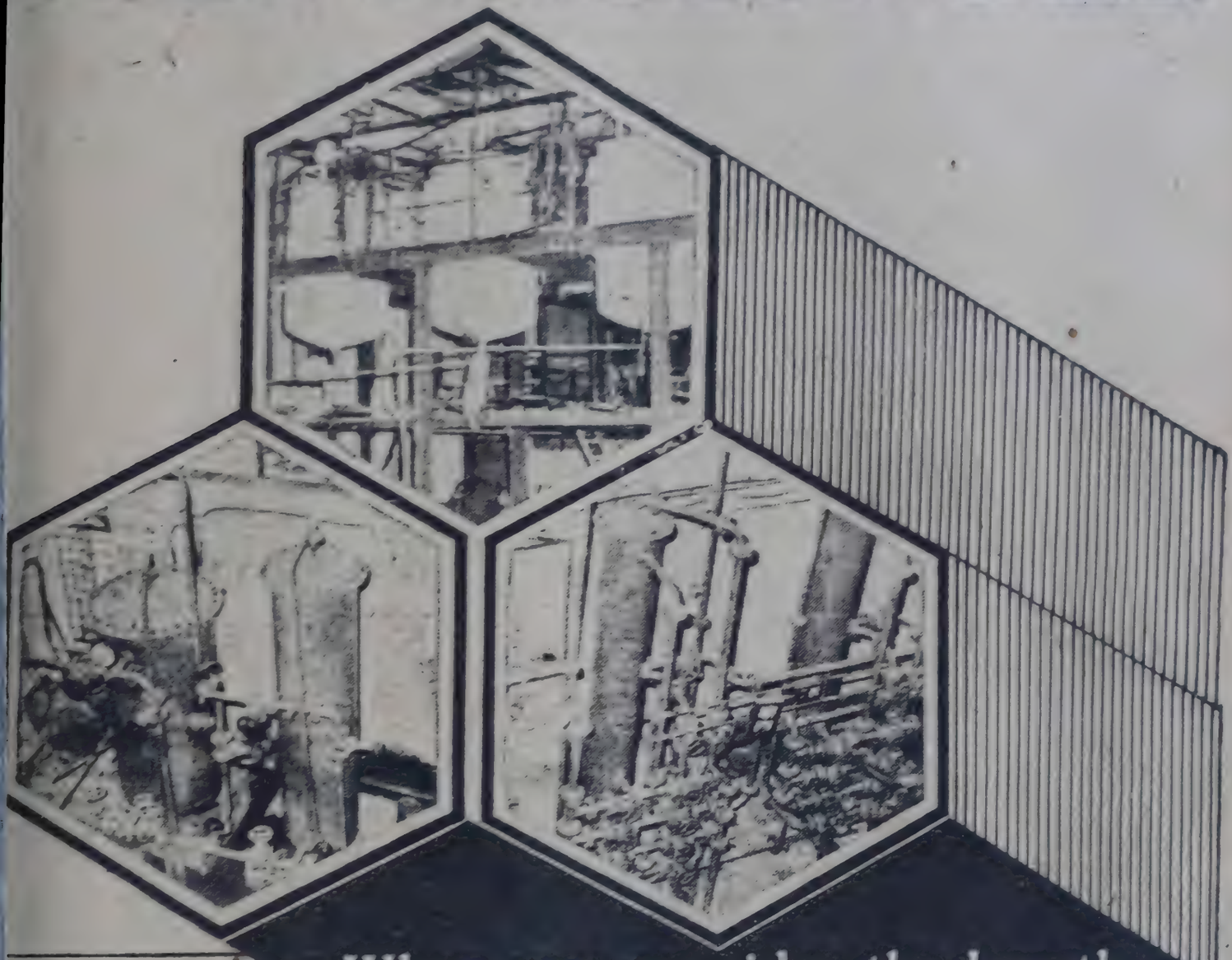
Targeted material is, for i nce, an ultrahigh heat-resis moldable ceramic produced combining silicon with nitro its potential applications are terior walls for the gas-turbin gine. MITI claims it is pos to produce machinable sem ductive material, side effect drugs and pollution-free pes es by combining silicon with elements.

The ministry envisages ir ing a total of roughly Y16 b in the said project over the ing 10 years and putting or silicon material into practica by the year 2000.

Silicon belongs to the ele tary group that includes ca so it is theoretically possib replace all the carbon atoms chemical substance with s atoms. Silicon is containe stones and rocks and is exp to serve as a promising el for substitutes for petroche products. At present, howe is utilized only in the form c cone resin — except for sen ductors — since it is unma able due to its high melting

In an effort to implemen project, MITI sent in late a joint survey team to Eur countries where R&D for c silicon has progressed to a extent. The mission visited (W. Germany) and Rhon enc (France).

PLASTI PIGMENTS PVT. LTD.



When you consider the lengths PPPL goes to give service with good quality, everything it manufactures is surprisingly economical.

Manufacturers of :

Benzoyl Peroxide
Powder & Paste form.
Methyl Ethyl Ketone Peroxide.
Tertiary Butyl Hydro Peroxide.
Tertiary Butyl Per Benzoate.
Di-Tertiary Butyl Peroxide.
Cyclohexanone Peroxide.
M.I.B.K. Peroxide.
Synthetic Pearl Essence
various grades.

NO WONDER B.A.R.C., B.A.S.F. BAKELITE HYLAM LIMITED., ENTRUST THEIR ENTIRE REQUIREMENT OF PEROXIDE CATALYSTS TO PLASTI PIGMENTS

PLASTI PIGMENTS PVT. LTD.
401, SAI CHAMBERS,
365/367, NARSI NATHA STREET,
BOMBAY-400 009
Tel : [illegible]

WHERE SERVICE IS A WAY OF LIFE

MARKET INFORMATION

Acrylamide Spurts Further

ute shortage of acrylamide ed up its prices by Rs. 15 to 110 per kg. Seasonal demand ed prices of hyflosupercell to 20. Non availability of Czech material pushed price of rangolite to Rs. 65 per kg. Aniline oil went up by Rs. 3 to Rs. 71 per kg. Low activity kept intermediates prices at previous levels.

We cannot guarantee the accuracy of the prices published in CHEMICAL WEEKLY as they are based only on the enquiries made by our correspondent – and, as such they are not FIRM PRICES as between a buyer and seller. The prices are published only with a view to giving some ideas of the market conditions.

The prices are inclusive of Excise and Maharashtra Sales Tax.

(Prices as on August 14, 1989)

STRIAL CHEMICALS	Per Kg.
onium sulphate	2.50
onium phosphate (Mono)	14.50
onium phosphate (Di)	14.00
onium carbonate (Di)	17.00
onium bicarbonate	5.60
onium chloride	3.00
onium nitrate	6.00
ic white powder	24.00
mide (Resale)	110.00
n carbonate	6.00
ning powder (33% Cl)	4.20
Borax (Granular)	15.00
Borax (Powder)	15.25
Boric acid (Tech)	28.00
Bisphenol-A	82.00
Butyl carbitol	110.00
Caustic soda (Flakes)	14.00
Caustic soda (Solid)	12.00
Caustic soda (Lye)	10.00
Calcium chloride 70% (Solid)	3.25
Calcium chloride 75-80%(fused)	3.50
Calcium chloride 36% (Anhydrous)	5.00
Calcium carbonate (precipitated)	4.25
Calcium carbonate (Activated)	4.75
Cobalt oxide	280.00
Cresylic acid	52.00
Camphor (Indian)	105.00
Cream of Tartar (Tech.) China	70.00
Citric acid (Belgium) (Resale)	47.00
Citric acid (Indian) (Resale)	47.00
Copper sulphate	24.00
Chromic acid	61.00
Ethylene urea	58.00
Ferric chloride (Lumps)	5.50
Ferric chloride (Anhydrous)	16.00
Glue flakes	15.00
Glue sheets	6.75
Gohsenol GH-17	115.00
Hydro	38+ST

Hyflosupercell	20.00
Hexamine (Resale)	35.00
Industrial Wax	25.00
Litharge	40.00
Lead Acetate (Tech.)	31.25
Lithopone	18.50+ST
Magnesium chloride (Crystal)	2.25+ST
Menthol crystal (Flakes)	900+Ex+ST
Menthol bold	665+Ex+ST
Menthol crystal cold	700+Ex+ST
Magnesium carbonate (Japan)	16.00
Magnesium carbonate (Indian)	18.00
Maleic Anhydride (Resale)	39.00
Mercury (34.5 Kgs)	12,000.00
Nickel chloride	110.00
Oxalic acid (Resale)	22.00
Peppermint oil (Rectified)	195+Ex+ST
Potassium carbonate (Indian)	30.00
Potassium carbonate (Imported)	32.00
Potassium bichromate	32.50+ST
Potassium phosphate (Mono)	14.00
Potassium phosphate (Di)	14.00
Polyvinyl alcohol (No. 117)	115.00
Polyvinyl alcohol (No. 173)	120.00
Polyvinyl alcohol (No. 208)	150.00
Paraformaldehyde (Resale)	23+ST
Phthalic anhydride 36% (Resale)	25.50
Pentaerythritol (Resale)	45.00
Paraffin wax	20+ST
Rangolite (German)	80+ST
Rangolite (Czech.)	65+ST
Sodium sulphate (Fine)	6.00
Sodium sulphate (Coarse)	5.00
Sodium sulphide 50-52% (Flakes)	11+ST
Sodium sulphide 58-60% (Flakes) (TCL)	20.00
Sodium sulphide pure (Flakes)	12.25
Sodium nitrite (Resale) per 50 kg.	680.00
Sodium chlorite 80% (Spain)	88.00
Soda Ash (Tata)	5.00
Soda Ash (Birla)	4.50
Soda Ash (Imp.)	4.50
Sodium bicarbonate	7.50
Sodium bisulphite	4.50
Sodium silicate	3.00
Sodium acetate	5.00
Sodium alginate	250+ST
Titanium Dioxide (Anatase)	130+ST
Titanium Dioxide (Rutile -- RCR_2)	150.00
Tartaric acid	100.00
Trisodium phosphate	5.50
Thiourea	80.00
Urea (Tech.)	2.90
Vacuum salt	1.00
Zinc Dust	32.00
Zinc Oxide	52.00
Zinc chloride powder (Tech.)	12.50
Zinc sulphate	7.00

SOLVENTS	Per Kg.
Acetic Acid Glacial (Resale)	14.50
Acetic Anhydride (Resale)	29.00
Acetone (Resale)	23.00
Adipic Acid	57.00
Aceto Acetanilide	55.00
Aniline Oil	71.00
Benzoate Plasticiser	62.00
Butyl acrylate	78+ST
Butyl stearate	50.00
Butanol	34
Benzyl Alcohol	6
Benzyl Chloride	3
Benzo trichloride	1
Benzoyl chloride	2
Bromine Liquid	7
Chloroform	3
Carbon Tetrachloride	1
Cellosolve	67
Cyclohexanone	54
Cyclohexanol	58
Diacetone (Resale)	3
Diethyl Oxalate	3
Diethyl glycol (DEG)	4
Dioctyl Phthalate	4
Diallyl Phthalate	5
Dimethyl Phthalate	2
Dioctyl Adipate	5
Dibutyl Adipate	4
Dipentene	1
Dimethylamine 40%	2
Dimethylamine 50%	3
Ethyl Acetate	3
Ethyl Acrylate	6
Ethylene Dichloride	1
Ethylene Glycol	4
Formic Acid (Imp.)	2
Formaldehyde (Resale)	1
Glycerine (CP)	1
Glycerine (IW)	1
Hydrogen Peroxide 50% (Resale)	1
Isopropyl Alcohol	1
Isobutyl Alcohol (Resale)	1
Monoethanolamine (Resale)	1
Melamine	1
Methyl Ethyl Ketone	1
Methyl Isobutyl Ketone	1
Methyl Acrylate	1
Methyl Dichloride (Resale)	1

Carbitol	68+ST
Meta Cresol	60.00
Nitrobenzene	30.50
Nitric Acid (Conc.) (RCF)	2.50
Ortho Cresol	30+ST
Phenol (Resale)	37.00
Propylene Glycol	55.00
Polyethylene Glycol (No.200)	52.00
Polyethylene Glycol (No.400)	53.00
Polyethylene Glycol (No.500)	42.00
Polyethylene Glycol (No.1600)	14.00
Polyethylene Glycol (No.4000)	70.00
Polyethylene Glycol (No.6000)	85.00
Para Cresol	110.00
Styrene Monomer	36.00
Sorbitol	14.00
Sulphuric Acid	2.80
Trichloroethylene	29.00
Triethanolamine (Resale)	65.00
Turpentine Oil (Germany)	8.00
Turkey Red Oil (50%)	20.00
Vinyl Acetate Monomer	47.50

SOLVENTS	Per Litre
Benzene	11.00
N-Heptane	10.50
N-Hexane	12.00
Methanol	13.00
Solvent Naphtha Heavy	10.50
Solvent Naphtha Light	8.50
Toluene	21.00
Xylene	24.50

DYES INTERMEDIATES (PRICES ARE WITHOUT TAX AND EXCISE)	
Alphanaphthylamine	63.00
Alpha Naphthol (Imp.)	190.00
Aceto Acetic Ester (Methyl)	66.00
Ammonium Molybdate	215.00
Anthraquinone	130.00
Anthranilic Acid	75.00
2-Amino 4-Nitrophenol	150.00
Blue B. Base (Local)	255.00
Beta Naphthol (Atul)	75.00
Benzidine Dihydrochloride (BDH)	98.00
Bromamine Acid	500.00
BON Acid	130+Ex+Ta
Chicago Acid IRS	330.00
Coach Acid	55.00
C. Acid (Imp.)	165.00
Cyanuric Chloride	135.00
2,4- DNCB	31.00
Dihydrothio PTOS (Imp.)	1,000.00
Dimethyl Aniline	70.00
Diethyl Aniline	185.00
Diamino stilbene disulphonic acid	165.00
3,3-DCB (Imp.)	175.00
Gamma Acid (Atul)	200.00
H. Acid (Atul)	110.00
G. Salt	75.00
Isophthalic Acid	45.00
J. Acid	330.00
J. Acid Urea	400.00
K. Acid	127.00
MPDS (German)	190.00
MNA	125
Meta Ureido Aniline	235
MPD (Local)	215
MPD (Japan)	250
Naphthenic Acid	40
N-Methyl J. Acid	540
N-Methyl Aniline	130
Naphthalene (Refined)	21
Ortho Anisidine (OA) (Imp.)	10
Ortho Dichloro Benzene (ODCB)	1
OT Base	11
Para Dichloro Benzene (PDCB)	2
Para Anisidine (PA local)	15
PNA	10
Para Cresidine (Imp.)	40
Para Amino Azo Benzene (India)	19
PNCB	4
Para Amino Acetanilide	17
1-Phenyl 3-Methyl 5-Pyrazolone	15
Phenyl J. Acid	37
Para Amino Benzoic Acid	13
PT Base	1
Rhoduline Acid	5
Resist Salt 80%	
Resorcinol	1
Sodium Naphthionate	
5-Sulpho-Anthranilic Acid	
Sulphanilic Acid	
Sulpho Tobias Acid	1
Trichloro Benzene (TCB)	
Tobias Acid	1
Metanilic Acid	
MTD	1

Bombay Dyes Market

(Prices as on August 14, 1989)

ACID COLOURS	Per Kg.
Acid Violet 4BS	*190.00
Acid Maroon V	110.00
Acid Orange II	112.55
Acid Orange IIY	93.85
Acid Red A	137.00
Acid Scarlet 3R	128.35
Acid Red 3BN	*195.00
Acid Red R2R	132.00
Acid Red RS	88.00
Acid Patent Blue AS	*280.00
Acid Green V	*375.00
Acid Coomasi Blue	200.00
Acid Yellow 5GN	65.00
Acid Red PG	85.00
Acid Red GRS	78.00
Acid Black 10 BX	157.15
Acid Black BX	126.95
Acid Black Wax	135.50
Crosein Scarlet MOO	200.30
Procinil Yellow GS (ICI, UK)	265.00
Procinil Red GS (ICI, UK)	530.00
Procinil Blue RS (ICI, UK)	315.00
Procinil Scarlet G (ICI, UK)	600.00
Procinil Orange G (ICI, UK)	250.00
Procinil Rubine (ICI, UK)	550.00

* To get resale price add 6% tax.

DIRECT COLOURS	Per Kg.
Yellow 3GX	114.00
Gun Yellow RCH	175.85
Fast Yellow GCH	171.50
Yellow CFG Hly. Conc.	721.00
Fast Yellow GS	126.96
Fast Yellow CHRS	116.85
Viscose Orange A	210.35
Fast Orange GR	171.50
Red	122.65
Dark Tan	98.15
Red IIR	98.15
Red 4B	217.55
Bordeaux BW	170.10
Fast Scarlet 4BS	223.50
Red 12B	220.45
Bordeaux Hly. Conc.	249.20
Cotton Red N	117.05
Brill. Fast Helio B	362.85
Brill. Fast Helio 2R	385.85
Brill. Fast Helio 2RS	177.30
Brill. Fast Helio BS	116.10
Brill. Violet Extra	181.45
Blue 2B	102.50
Blue G	220.45
Sky Blue FB	242.00
Copper Blue GR	190.25
Fast Greenish Blue GL	114.60
Developed Black BT	149.95
Blue NB-2B	348.45
Blue NB-2BG	214.70
Developed Black NB-GHB	214.70
Green B	142.75
Green NB-B	218.90
Green 2B-N	218.90
Brown MR	197.40
Brown CN	137.00
Golden Brown G	175.85
Catechin G	155.70
Omega Tan	161.45
Catechin GS	102.80
Black E Hly. Conc.	180.15
Black E Extra Hly. Conc.	180.15
Black NB-ER Hly. Conc.	290.50

DISPERSOL COLOURS	Per Kg.
Red B 3B Conc	611.50
Red B 2B Conc	797.90
Red CB Powder	1048.25
Red D2B Powder	589.85
Violet C 4R Conc.	1202.70
Blue BG Conc	580.65
Blue BN Powder	128.20
Blue D 2R Powder	588.25
Navy BT Conc	531.95
Blue B 2G Conc	577.95
Black BT Conc	319.50
Blue BR	482.40
Yellow 7GL	813.20
Yellow 5RX	269.90
Yellow 3G	473.20
Yellow	140.00
Yellow AL	167.20
Yellow Brown REL	311.70
Yellow FFL	571.40
Gold Yellow GG	320.80
Pink REL	593.00
Red BEL	615.60
Red 2B	422
Red FB	425
Red Violet FBL	622
Orange 3R	254
Violet 3R	370
Violet RL	355
Violet 6R	638
Scarlet RR	283
Rubine 3B	289
Rubine CB	449
Blue GL	419
Blue BGF	80[illegible]
Navy Blue RE	35[illegible]
Brown 3REL	27[illegible]
Black GEL	42[illegible]
Dark Brown 3B	41

BASE COLOURS	Per
Fast Yellow GC	7
Fast Orange GC	12
Fast Scarlet R	19
Fast Scarlet RC	12
Fast Scarlet RCR	10
Fast Scarlet G	1
Fast Scarlet GN	[illegible]
Fast Scarlet GG	[illegible]
Fast Scarlet GGS	[illegible]
Fast Red B	2[illegible]
Fast Red RC	1
Fast Red R Flakes	1
Fast Red TR	1
Fast Red TR Oil	2
Fast Red RL	2
Fast Red KB Oil	2
Fast Bordeaux GP	2
Fast Garnet GBC	1
Fast Violet B	5
Fast Blue BB	5

NAPHTHOL COLOURS	Pe
ASG	[illegible]
AS	[illegible]
ASSW	[illegible]
ASBS	[illegible]
ASBO	[illegible]
ASD	[illegible]
ASOL	[illegible]

STR	369.00
SPH	336.05
SE	236.00
SEL	249.95
SLB	2002.35
SBT	2459.45
SWG	143.00
SSG	538.65
SSR	652.60

ROCION COLOURS	Per Kg.
lden Yellow HR	207.95
ll. Yellow H4G	145.65
pra Yellow H-8GP	168.55
ll. Yellow HE6G	214.75
llow G-E4R	276.05
ll. Yellow H7G	332.30
llow M4R	275.45
llow MGR	387.65
ll. Yellow M4G	201.15
ll. Yellow M8G	366.10
llow M3R	244.70
ll. Orange H2R	303.80
ll. Red H7B	157.95
ll. Orange M2R	313.15
ll. Red H8B	213.55
ll. Scarlet H RN	245.05
ora Red H-3BP	179.80
l. Red H-F3B	243.45
ll. Magenta HB	182.00
l. Red M 5B	160.05
l. Red M 8B	218.35
l. Pink MB	137.10
l. Magenta MB	163.65
l. Purple H-3R	219.55
l. Purple H-7R	175.40
vy Blue H 3R	333.75
l. Blue H-GR	406.40
l. Blue H5G	207.95
e H 5RX	286.20
l. Blue H 7G	213.95
l. Blue H 7RX	358.15
quoise HA	265.05
ora Blue H-3RP	595.30
ora Turquoise H 2G P	181.50
Blue H-FRD	305.80
Navy Blue H3R	333.75
Blue H 5RX	286.20
Navy Blue M3R	355.70
Brill. Blue MR	405.60
Brill. Blue M RX	214.20
Brill. Blue M-G	226.45
Blue M 4GD	369.40
Navy Blue M RB	341.85
Turquoise M-G	240.30
Brill. Blue M GX	516.25
Blue 3R Acra Powder	718.20
Dark Brown H 6R	248.45
Cobalt Oxide	285.00
Green H4BD	287.00
Green H-E4BI	169.80
Red Brown H IF	143.25
Orange Brown H 28	209.05
Brown M GRN	188.80
Black H-N	314.20

SULPHUR COLOURS	Per Kg.
Navy Blue	210.35
Green G	194.55
Black Grains Extra	72.25
Black Grains OG	73.70
Black GXE Conc.	70.85
Black GXE	57.90
Black GXR	69.40
Black Grains 800	62.80
Black EXR Grains	73.70
Black EXR Grains 800	59.35

VAT COLOURS (ICI)	Per Kg.
Yellow 5G Supra Disperse	561.85
Yellow 5G Acra Conc	818.60
Gold Orange 3G Pdr. Fine	1158.45
Brill. Orange 6R Pdr. Fine	624.35
Gold Orange 3G Supra Disp	693.85
Brill. Orange 6RX Powder	394.30
Brill. Red 3B Pdr. Fine	1214.15
Brill. Red 3B Supra Disp	867.45
Brill. Purple 3R Acra Powder	827.05
Brill. Purple 2R Hly Conc.	744.25
Brill. Purple 4R Supra Disp.	604.25
Brill. Purple 2R Acra Conc.	779.85
Blue 2R Powder Fine	675.30
Blue BC Acra Con Pdr. Fine	1013.15
Blue BC Conc. Pdr. Fine	713.65
Blue R Conc. Pdr. Fine	719.70
Blue Conc. Powder	645.80
Brill. Blue 2R Hly. Conc.	378.55
Blue RR Supra Powder	629.35
Brill. Blue 2R Supra Disp.	115.65
Dark Blue 2R Powder Fine	512.65
Blue BC Supra Disp.	419.65
Jade Green XBN Powder Fine	555.80
Jade Green XBN Acra Conc. Pdr	1026.05
Jade Green 2G Pdr. Fine	533.25
Jade Green 2G Ptg. Paste	125.40
Jade Green XBN Ptg. Paste	126.00
Jade Green 2G Supra Disp.	618.00
Olive D Pdr. Fine	563.90
Olive Green B Supra Disp.	421.70
Jade Green XBN Supra Disp. (N)	327.30
Olive OMW Powder Fine	698.55
Olive OMW Supra Disp.	538.05
Olive D Supra Disp.	361.70
Olive R Supra Disp.	470.25
Olive D. Ptg. Paste	193.00
Olive Green B Ptg. Paste	199.10
Olive Green B Acra Conc.	741.10
Olive R Acra Conc.	779.85
Brown R Pdr. Fine	869.45
Dark Brown 3R Fine	826.25
Brown G Supra Disp.	582.05
Brown 2G Supra Disp.	716.10
Brown R Supra Disp.	547.35
Brown BR Powder	867.75
Dark Brown 3R Ptg. Paste	217.15
Dark Brown 3R Supra Disp.	529.00
Brown G Acra Conc.	967.95
Brown M. Powder Fine	768.80
Grey M. Supra Disp.	585.45
Blue BC Acra Conc. Pdr. Fine	762.70
Direct Black AC Supra Disp.	415.75
Direct Black AC Pdr. Fine	574.70
Direct Black CH Supra Disp.	490.45
Direct ACD Ptg. Paste	217.15

Delhi Market

DELHI: AUGUST 11, (NNS) A sharp rise of Rs. 29 per kg in menthol flake provided the main feature of trading in the Delhi chemical market during last week, reports NNS. Other chemicals exhibited a mixed trend. Menthol flake jumped up from Rs. 255 to Rs. 290 per kg on account of heavy mutual speculation among so-called speculators for August, Diwali and December delivery but at the weekend due to fresh profit, taking selling by stockists it reacted downward and closed at Rs. 284, showing a net profit of Rs. 29 over last week levels. Menthol medium and bold quoted higher by Rs. 10 each at Rs. 320 and Rs. 350 per kg respectively on account of restricted inflow from U.P. Similarly mentha oil Shivalik and MS 1 hardened from Rs. 190 and Rs. 200 to Rs. 235 and Rs. 245 on speculative demand but later it slipped by Rs. 20 each and closed at Rs. 215 and Rs. 225 per kg. DMO held steady at the previous level of Rs. 110. Menthol flake December delivery was transacted at Rs. 355 per kg.

On account of heavy buying support by the traders of South for forthcoming festivals, camphor powder and thal hardened by Rs. 1/2 at Rs. 107 and Rs. 118 per kg respectively. Titanium dioxide went up by Rs. 3 at Rs. 124 per kg owing to restricted supply by companies. Titanium dioxide anatase K brand of Calcutta was traded at Rs. 108 per kg, RC-822 also jumped up from Rs. 150 to Rs. 155 due to shortage of supply and sustained demand shown by plastic and paint units.

Soda ash Tata and Birla moved up from Rs. 350 to Rs. 355 on good demand by detergent powder manufacturers as well as dwindling supply. Soda ash Nal and Gujarat was quoted at Rs. 340 and Rs. 345 per kg. Ammonia bicarb and caustic soda flake quoted cheaper by Rs. 5 each on improved supply. As a result of slack demand paraffin wax suffered a fall of Rs. 20 at Rs. 820 while slack wax recorded a sharp rise of Rs. 100 at Rs. 9,100 in the wake of sustained demand shown by refineries. Sodium sulphate advanced by Rs. 50 at Rs. 3,250/3,350. Chatkolite eased by Re. 1 at Rs. 62/kg and sodium hydrosulphite Damosha, Tamilnadu and Germany softened by 50 paise at Rs. 36 each per kg. Sodium hydro Gulshan and Kalali quoted cheaper at Rs. 34 and Rs. 37 in the absence of demand from gur and khandsari manufacturers.

Basic rhodamine local slipped by Rs. 25 at Rs. 300 per kg on account of reduced prices of raw material while Atul's basic rhodamine held steady at Rs. 425.

(DELHI MARKET RATES AS ON AUGUST 11, 1989)

Ammonia Bicarb (Per 25 Kg.)	150.00
Mercury (Per flask)	11,600.00
Soda ash (Per bag)	335/355.00
Ammonium Chloride (50 Kg.)	110/180.00
Caustic soda flakes (50 Kg.)	590/595.00
Citric acid (Per 50 Kg.)	2,160/2,500.00
Stable Bleaching Powder Shriram (Per 25 Kg.)	100.00
Stable Bleaching Powder KCI (Per 25 Kg.)	95.00
Stable Bleaching Powder Maruti (Per 25 Kg.)	90.00
Stable Bleaching Powder Modi (Per 25 Kg.)	98.00
Sodium Bicarbonate (50 Kg.)	290/300.00
Sodium Hydrosulphite (Per Kg.)	34.00/37.00
Rangolite (Per Kg.)	62.00/77.00
Boric acid Technical (Per 50 Kg.)	1,400.00
Paraffin Wax (Per 50 Kg.)	820.00
Tartaric Acid (Per 50 Kg.)	10,750.00
Borax Granular (Per 50 Kg.)	700.00
Borax Crystal (Per 50 Kg.)	705.00
Sodium Nitrite (Per 50 Kg.)	700/760.00
Sodium Nitrate (Per 50 Kg.)	425.00
Camphor Thal (Per Kg.)	118.00
Camphor Powder (Per Kg.)	107.00
Menthol Bold (Per Kg.)	350.00
Menthol Medium (Per Kg.)	320.00
Menthol Flake (Per Kg.)	284.(
Glycerine (Per Kg.)	55/58.(
Sodium Silicate (Per quintal)	250/300.(
Hexamine (Per Kg.)	30.(
Acetic Acid Glacial (Per Kg.)	14.(
Copper Sulphate (Per quintal)	2,350/2,7(
Formic Acid (Per Kg.)	25.(
Formaldehyde (Per Kg.)	8.(
Hydrogen Peroxide (Per Kg.)	27.(
Calcium Carbonate (Per Tonne)	2,500/4,0(
Acid Slurry Soft (Per Kg.)	24.(
Acid Slurry Hard (Per Kg.)	34.(
Phosphoric Acid (Per 50 Kg.)	1,050.(
Potassium Nitrate (Per quintal)	900/1,200.(
Potassium Permanganate (Per 50 Kg.)	2,800/3,200.(
Sodium Bichromate (Per 50 Kg.)	1,575/1,600
Trisodium Phosphate (50 Kg.)	525
Titanium Dioxide Anatase (Per Kg.)	124
Titanium Dioxide RC-822 (Per Kg.)	155
Titanium Dioxide K-Brand (Per Kg.)	108
Titanium Dioxide RCR-2 (Per Kg.)	155
Zinc Oxide (Per metric tonne)	42,000/52,000
Phenol Carbolic Acid (Per Kg.)	37
Carbon Tetrachloride (Per Kg.)	24
Chloroform (Per Kg.)	28
Sodium Sulphate (Per metric tonne)	3,250/3,550
Naphthalene Balls (Per 50 Kg.)	1,325

DYES & COLOURS	(Per K
Naphthol AS	175/201
Naphthol ASG	180/295
Naphthol ASBS	210/245
Naphthol ASTR	265/360
Naphthol ASOL	210/235
Naphthol ASBO	195/260

DIRECT DYES	(Per K
Black E. Conc.	110/170
Diazo Black B.T.	105/14(
Green B	90/140
Blue 2-B	60/10(
Blue 2-B 225% (JNR)	125
Sky Blue FB	160/235
Basic Auramine	55/110
Basic Rhodamine	300/425
Basic Methylene Blue	100/185
Basic Violet	150/185
Basic Malachite Green	150/165
Acid Orange	75/11(
Congo Red H/C	75/12(

Madras Market

narket remained sluggish much activity was seen. as a slump in caustic soda prices and the keenness of nufacturers to unload the in the market, may make rop further in the course of the next few weeks. Hence buyers are cautious in their commitments. Availability of NOCIL's solvents continues to be difficult as packed supplies are not forthcoming in good measure. Hexamine prices are showing an upward trend.

MADRAS MARKET RATES AS ON AUGUST 12, 1989)

d Glacial (per kg)	16.50
n Sulphate Iron free	
)	4,000.00
n Bicarbonate	
kgs)	150.00
n Chloride (per MT)	3,000.00
y (per kg)	28.00
arbonate (per kg)	6.00
hloride (per kg)	5.50
l Technical (per kg)	27.00
Powder (per 50 kgs)	250.00
r 50 kgs)	700.00
oda Flakes -- Mettur	
als (per MT)	12,000.00
oda Flakes -- Andhra	
(per MT)	12,000.00
Chloride 70% Solid	
T)	3,000.00
Chloride Anhydrous	
T)	5,000.00
Carbonate (Activated)	
T)	6,000.00

Calcium Carbonate (Precipitated) (per MT)	5,000.00
Citric Acid (per kg)	47.00
Copper Sulphate (per kg)	24.00
Cresylic Acid 98-99% (per kg)	120.00
Pure Para Cresol 96% (per kg)	80.00
Meta Para Cresol 42% (per kg)	47.00
Formic Acid (per kg)	28.00
Formaldehyde (per kg)	8.50
Glue Flakes (per kg)	15.00
Glycerine (per kg)	49.00
Hydrosulphite of Soda (TCPL) (per kg)	41.00
Hydrosulphite of Soda (IDI) (per kg)	43.00
Hydrosulphite of Soda (BASF) (per kg)	43.00
Hexamine (per kg)	34.00
Hyflo Supercell (per kg)	20.00
Hydrogen Peroxide (per kg)	30.00
Litharge (per kg)	40.00
Lead Acetate (per kg)	42.00
Magnesium Carbonate (per kg)	19.50
Magnesium Chloride (per kg)	3.50
Maleic Anhydride (per kg)	40.00
Menthol Crystals (per kg)	300.00
Oxalic Acid (per kg)	24.00
Paraffin Wax (per kg)	24.00
Potassium Bichromate (per kg)	36.00
Phosphoric Acid (per kg)	22.00
Polyvinyl Alcohol powder (per kg)	130.00
Pentaerythritol (per kg)	52.00
Phthalic Anhydride (per kg)	30.00
Soda Ash (TAC) (per 75 kgs)	385.00
Soda Ash (TATA) (per 75 kgs)	385.00
Sodium Bicarbonate (TATA) (per 50 kgs)	375.00
Sodium Silicate (per MT)	3,000.00
Sodium Bichromate (per kg)	28.00
Sodium Nitrate (per kg)	8.00
Sodium Nitrite (per kg)	15.00
Sodium Sulphide Flakes (per kg)	12.00
Sodium Bisulphite (per kg)	4.50
Sodium Alginate (per kg)	210.00
Sodium Acetate (per kg)	7.00
Sodium Sulphate (Anhydrous) (per kg)	3.00
Titanium Dioxide (Anatase) (per kg)	135.00
Titanium Dioxide (Rutile) (per kg)	145.00
Trisodium Phosphate (per kg)	7.00
Urea (Technical) (per kg)	3.00
Zinc Oxide (per kg)	54.00
Zinc Chloride Powder (per kg)	12.50
Zinc Sulphate (per kg)	7.00

SOLVENTS

Acetone -- HOCL (per kg)	18.75
Butanol (per kg)	36.00
Butyl Acetate (per kg)	44.00
Benzene (per lit)	17.00
Cellosolve (per kg)	50.00
Carbon Tetra Chloride (per kg)	23.00
Chloroform (per kg)	28.00
Diacetone Alcohol (per kg)	29.50
Diethylene Glycol (per kg)	47.00
Dichloroethane (per kg)	17.00
Di-octyl Phthalate (per kg)	50.00
Di-N-butyl Phthalate (per kg)	50.00
Ethyl Acetate (per kg)	20.00
Isopropyl Alcohol (per kg)	30.00
Methanol (per kg)	12.00
Methylene Chloride (per kg)	22.00
Methyl Ethyl Ketone (per kg)	42.00
Methyl Isobutyl Ketone (per kg)	39.00
Phenol (per kg)	38.00
Sorbitol (per kg)	15.00
Triethanolamine (per kg)	60.00
Trichloroethylene (per kg)	25.00
1-1-1 Trichloroethane (per kg)	28.00
Turpentine (per lit)	17.00
Toluene (per lit)	22.00
Xylene (per lit)	24.00

Shipping News

VESSELS DUE IN BOMBAY FOR EXPORT LOADING

Due Date (1)	Steamer's Name & Flag (2)	Agents (3)	Will load for (4)	Ap sail (
20/8	Eagle Star (V-015)	F.F.C. Co.	Los Angeles (Harbour); Longbeach; Sanfrancisco; Oakland; Seattle; Vancouver (B.C.); Portland; New York; Boston; Norfolk; Baltimore; Charleston; Savannah; Miami; New Orleans; Houston; Montreal; Toronto; Fortworth; Chicago; Nashville; Atlanta; Philadelphia; Milwaukee; Kansas City; Phoenix; Gaum; Dallas; Cleveland; St. Louis; Cincinnati; Denver; Louisville; Memphis; Wilmington (B.C.); San Diego; Minneapolis; Indianapolis and Central American ports; Honolulu. (Carting at Timber Pond No. 1).	
22/8	Chandidas (Ind)	S.C.I.	New York; Baltimore; Savannah (Direct) and other inland destinations. (Carting at Timber Pond No. 1).	
23/8	Ocean Strength (Voy-15A/B)	O.S.A.	New York; Baltimore; Philadelphia; Houston; Boston; Chicago; Dallas; Atlanta; Savannah; Norfolk; Charleston; Los Angeles; Sanfrancisco; Oakland; Seattle; Vancouver: Toronto; Montreal; Portland; Tacoma & S. American and W. Indies Ports. (Carting M-178/180 Cotton Depot).	
25/8	Uni Pioneer (Voy-012)	Greenways	New York; Newark; Baltimore; Charleston; New Orleans; Houston; Boston; Providence (RI); Philadelphia; Norfolk; Savannah; Jacksonville; Wilmington; Miami; Montreal; Toronto; Bermuda; Los Angeles; Longbeach; Sanfrancisco; Oakland; San Diego; Stockton; Richmond; Almeida; Redwood City; Sacramento; Seattle; Portland; Vancouver (B.C.); Tacoma; Longview; Chicago; Dallas; various inland destinations and Caribbean ports. (Carting at G/H Cotton Depot).	
26/8	Waterkoning	Merzario	Dakar; Abidjan; Monrovia; Lome; Douala; P. Noire; Matadi; Libreville; Cotonou; P. Gentil; Lagos; P. Harcourt; Warri; Freetown; Conakry; Louanda; Nouakchott; Guinea; Blassa. (Carting at M.O.D. No. 2).	
Stream	Pazin (Yug)	Oceanic	Jeddah; Rijeka.	
Stream	Petr Dutov (Rus)	Transocean	Odessa; Illyichevsk; Havana (Cuba); Genoa; Trieste; Piraeus; Marseilles; Barcelona; Varna; Bourgas. (Carting at Timber Pond No. 1).	
15/8	Drvar (Yug)	Oceanic	P. Said; Rijeka.	
20/8	Mereike	U.L.A.	Aden; Hodeidah; P. Sudan; Djibouti.	
22/8	Tibor Szamuely (Rus)(V-101 W/B)	Transocean	Odessa; Izmail; Reni (USSR); Russe (Bulgaria); Budapest (Hungary); Linz; Vienna (Austria); Bratislava (Czechoslovakia); Deggendorf; Reganborg (West Germany). (All ports on River Danube). (Carting at N/O-PD & G-PD).	
20/8	Eagle Star	F.F.C. Co.	Jeddah; P. Sudan; Hodeidah. (Carting at Timber Pond No. 1).	
22/8	Chandidas (Ind)	S.C.I.	Felixstowe; Hamburg; Rotterdam; Antwerp; Bremen; Liverpool; Le Havre; Manchester; Avonmouth; London; Belfast; Aarhus; Oslo; Copenhagen; Gothenburg; Helsinki and all inland destinations. (Carting at Timber Pond No.1).	
25/8	Uni Pioneer (V-012)(Pan)	Greenways	Hamburg; Felixstowe; Rotterdam; Antwerp; Le Havre; Leghorn; Genoa; Marseilles (Fos); Valencia; Barcelona; Limassol; Las Palmas; Casablanca; Istanbul. (Carting at G/H Cotton Depot).	
26/8	Waterkoning (Dut)	Samrat/ Hindustan/ Merzario	Felixstowe; Hamburg; Rotterdam. Also London; Liverpool; Leixoes; Lisbon; Manchester; Avonmouth; Wembly; Birmingham; Leicester; Le Havre; Amsterdam; Bremen; Antwerp; Copenhagen; Leeds; Aarhus; Gothenburg; Oslo; Stockholm; Helsinki; Belfast and all destinations in U.K. Benelux; Germany, Italy, France, Switzerland and Austria. (Carting at M.O.D. No. 2 for Merzario) (Carting at M.O.D. No. 1 for Samrat & Hindustan).	
Stream	Petr Dutov	Transocean	Afghanistan. (Carting at Timber Pond No. 3).	
20/8	Eagle Star	F.F.C. Co.	Colombo. (Carting at Timber Pond No. 1).	
21/8	Mercs Maho	Mackintosh	Karachi	
19/8	Mizoram (Ind)	S.C.I.	Main Japan ports.	
20/8	Eagle Star (V-015) (Cyp)	F.F.C. Co.	Penang; P. Kelang; Singapore; Bangkok; Jakarta (T. Priok); Hongkong; Manila; Busan; Keelung; Kaohsiung; Kobe; Yokohama; Nagoya; Osaka; Tokyo; Tsingtao; Dairen; Quangzhou; Whampoa; Shanghai; Hsingkang; Rangoon. (Carting at Timber Pond No. 1).	

(2)	(3)	(4)	(5)
Piran (Yug)	Depe	Hongkong; Keelung; Kaohsiung; Kobe; Yokohama; Busan.	30/8
Ocean Strength (Lib)(Voy-15 A/B)	O.S.A./	P. Kelang; Singapore; Kaohsiung;; Hongkong; Bangkok; Kobe; Yokohama; Nagoya; Moji; Osaka; Busan; Tokyo; Simizu; Keelung; Tsingtao; Quindao; Xiangang; Shanghai. (Carting at M-178/180 C.D. for O.S.A.).	
	M.S.P.L.	Singapore; Bangkok; P. Kelang; Penang; Jakarta; Manila. (Carting at Hay Bunder No. 4).	
Uni Pioneer (V-012) (Pan)	Greenways	Singapore; Penang; Port Kelang; Bangkok; Djakarta; Surabaya; Manila; Cebu; Kaohsiung; Keelung; Osaka; Yokohama; Kobe; Shimizu; Moji; Nagoya; Pusan; Hongkong. (Carting at G/H Cotton Depot).	31/8
Eagle Star	F.F.C. Co.	Brisbane; Fremantle; Sydney; Melbourne; Adelaide. (Crtg. T.P. No. 1).	25/8
Ocean Strength	O.S.A.	Sydney; Melbourne; Adelaide; Brisbane; Fremantle; Auckland; Wellington; Lyttelton; P. Chalmers. (Carting at M-178/180 C.D.).	30/8
Sira Trader (Nor)	I.L.S.A.	Dubai	23/8
Al Khansaa (Iraqi)	Al Rafidain	Umm Qasr (Iraq).	26/8
Eagle Star (V-015)	F.F.C. Co.	Dubai; Sharjah; Abu Dhabi; Doha; Muscat; Dammam; Riyadh; Bahrain; Kuwait. (Carting at Timber Pond No. 1).	25/8
Mareike (V-896)	U.L.A.	Dubai; Bahrain; Kuwait; Dammam; Riyadh; Abu Dhabi; Doha.	25/8
Vishva Nandini (Ind)	S.C.I.	Seychelles; P. Louis; Tamatave; Mombasa; Dar Es Salaam; Beira and inland destinations in E. Africa. (Carting at Timber Pond No. 1).	25/8

VESSELS DUE IN BOMBAY FOR IMPORT DISCHARGE

ıte	Steamer's Name	Agents	From
	Chandidas	S.C.I.	U.K. Cont./U.S.
	Shazli	Intermedal	Turkey
	Sulu Express	S.C.I.	U.K. Cont.
	Tibor Szamuely (Voy-101)	Transocean	Russia/E. Europe
	Vishva Siddhi	S.C.I.	Med. Ports

Materials Imported

BOMBAY
(From 1.5.89 to 3.5.89)

CETO ACET PARA CHLORO LIDE TECH. DRY: From FRG: arshan Chemical Inds. Ltd., 480 , Rs. 93,880.

CTIVATED BLEACHING TH: From FRG: MP Oils & Fats Ltd., 16 MTs., Rs. 1,00,057.

EROSIL 200: From Belgium: ls Pharmaceuticals, 1,860 Kgs., 1,76,427; S.G. Pharmaceuticals, 0 Kgs., Rs. 1,85,738.

LBENDAZOLE: From China: khardt Veterinary Pvt. Ltd., 100 ., Rs. 74,686.

LDEHYDE C-12: From FRG: ta Chemical Co., 150 Kgs., 37,773; From Swtizerland: Sun ort Corpn., 250 Kgs., Rs. 95,412.

LUMINIUM HYDROXIDE VDER: From FRG: Fort Gloster stries Ltd., 2 MTs., Rs. 32,737.

LUMINIUM OXIDE SYNTHE-: From Japan: Grindwell Norton , 12,500 Kgs., Rs. 5,94,215.

LUMINIUM OXIDE: From USA: o Plast Abrasives (I) Ltd., 500 Kgs., 42,819.

LUMINIUM PASTE: From UK: n Paints India Ltd., 800 Kgs., 92,208.

MINO ACID CONC.: From UK: M Ltd., 1,000 Kgs., Rs. 43,940.

MINO ETHYL PROPYL THYL DIMETHOXYSILANE: n FRG: Reliance Silicones Pvt. ., 540 Kgs., Rs. 2,03,976.

MMONIA PURITY 99.99%: From nce: Khandelwal Herrmann Elect. ., 50 Kgs., Rs. 37,435.

MMONIUM PERSULPHATE: m FRG: Sagar International, 5 MTs., 1,14,086; S.D. Fine Chem Pvt. Ltd., MTs., Rs. 45,635.

ANILINE OIL: From FRG: Bayer India Ltd., 18,940 Kgs., Rs. 5,40,545.

ANISALDEHYDE: From Japan: Grauer & Weil India Ltd., 1,125 Kgs., Rs. 1,75,953.

ANTIMONY OXIDE: From China: Neo Techno Chemicals, 10,000 Kgs., Rs. 3,02,919.

ARSENIC ACID: From UK: Indian Dyestuff Inds. Ltd., 3,000 Kgs., Rs. 91,017.

2-B ACID TECH: From Korea: Sudarshan Chemical Inds. Ltd., 4,000 Kgs., Rs. 3,27,310.

BENZALDEHYDE: From Japan: Shashank Chemicals, 5,600 Kgs., Rs. 1,43,196; From Netherlands: S.H. Kelkar and Co. Ltd., 10,000 Kgs., Rs. 2,61,219.

BETA HYDROXY ETHYL HYDRAZINE: From Netherlands: Curefast Drugs & Intermediates, 600 Kgs., Rs. 71,472.

BETA NAPHTHOL: From Hong Kong: Mardia Chemicals Ltd., 16 MTs., Rs. 7,35,188.

BIS PHENYL CARBOXYLAMINE PHENYL SULPHIDE: From UK: Sankya Chemicals Ltd., 5,000 Kgs., Rs. 4,24,199.

BORAX: From USA: V.S. Syndicate, 4 MTs., Rs. 25,178.

1-BROMO 3-CHLORO PROPANE: From FRG: Kantilal Manilal & Co., 2,500 Kgs., Rs. 1,69,141.

BUTYL PEROXIDE TECH.: From FRG: Bindal Agro Chem Ltd., 1,000 Kgs., Rs. 79,744.

BUTACHLOR TECH.: From USA: Herbicides India Ltd., 34,920 Lbs., Rs. 7,30,838; Hindustan Pulverising Mills, 31.68 MTs., Rs. 14,83,656; Northern Minerals Ltd., 15,840 Kgs., Rs. 7,41,828.

BUTACHLOR TECH. 92% MIN.: From USA: Omega Agro Pvt. Ltd., 58,100 Kgs., Rs. 29,67,312; Vithai Abrichem Inds. Ltd., 34,920 Lbs., Rs. 7,41,828.

CALCIUM CARBONATE: From UK: Glindia Limited, 2,000 Kgs., Rs. 34,602.

CALCIUM OXIDE: From Netherlands: B.M. Thakker & Co. Pvt. Ltd., 1,000 Kgs., Rs. 11,168.

CARBOFURAN TECH. (MIN. 75%): From Japan: Pesticides India, 12,400 Kgs., Rs. 20,48,832.

CARBON BLACK: From FRG: Asian Paints India Ltd., 600 Kgs., Rs. 26,945; C.J. Shah & Co., 3,000 Kgs., Rs. 73,209; From USA: Gestetner Ltd., 550 Lbs., Rs. 19,308.

CINNAMIC ALCOHOL: From FRG: The Tata Oil Mills Co. Ltd., 400 Kgs., Rs. 46,168.

CITRIC ACID MONOHYDRATE: From China: Shyam Overseas Corpn., 17,500 Kgs., Rs. 3,02,920.

CYANO PYRAZINE: From Japan: Jebco Pharma Pvt. Ltd., 4,000 Kgs., Rs. 23,09,546.

2-CYANO PYRAZINE 99% PURITY: From Japan: Nirlac Chemicals, 1,000 Kgs., Rs. 5,79,297.

CYSTEAMINE HYDROCHLORIDE: From Japan: Glindia Limited, 2,000 Kgs., Rs. 3,07,482.

CYANURIC CHLORIDE: From FRG: C.J. Shah & Co., 12,000 Kgs., Rs. 5,54,009; From Belgium: Ajanta Chemicals, 500 Kgs., Rs. 23,084; Akash Dye Chem, 1,000 Kgs., Rs. 46,167; Amardeep Dye Chem, 2,000 Kgs., Rs. 92,335; Anil Inds., 2,000 Kgs., Rs. 92,335; Arun Dyestuff Inds., 500 Kgs., Rs. 23,084; Ashutash Organics, 1,000 Kgs., Rs. 46,167; Atic Inds., 22,000 Kgs., Rs. 10,15,684; Atul Products Ltd., 2,000 Kgs., Rs. 92,335; Ekta Enterprises, 500 Kgs., Rs. 23,084; Galaxy Dyes, 500 Kgs., Rs. 23,084; Gautam Chemical Inds., 1,000 Kgs., Rs. 46,167; Khyate Chemical Inds, 1,000 Kgs., Rs. 46,167; Laxmi Chemi-

cals, 1,000 Kgs., Rs. 46,167; M.M. Industries, 1,000 Kgs., Rs. 46,167; Nancy Dyes & Intermediates, 500 Kgs., Rs. 23,084; Paramount Minerals and Chem. Ltd., 1,000 Kgs., Rs. 46,167; Rajasthan Dyes & Pigments, 500 Kgs., Rs. 23,084; Rajsons, 500 Kgs., Rs. 23,084; S.B. Vora & Co., 1,000 Kgs., Rs. 46,167; Shreeji Industries, 500 Kgs., Rs. 23,084; Shreenathaji Chemical Inds., 600 Kgs., Rs. 23,084; Shyam Dyes Chemical Inds., 1,000 Kgs., Rs. 46,169; Sweta Industries, 1,000 Kgs., Rs. 46,167; Synorg Dyechem, 500 Kgs., Rs. 23,084; Tex Dyes Inds., 1,000 Kgs., Rs. 46,167; Umesh Inds., 1,000 Kgs., Rs. 46,167; Vallabh Dyechem, 1,000 Kgs., Rs. 46,167; From Belgium: Whitex Chemicals, 500 Kgs.. Rs. 23,084.

D(-)_ ALPHA P-HYDROXY PHENYL BASE: From Italy: Kopran Chemical Co., Ltd., 2,000 Kgs., Rs. 8,65,482.

D CAMPHOR SULFONIC ACID: From Taiwan: Wockhardt Ltd., 1,000 Kgs., Rs. 1,84,898.

D(-) PARA HYDROXY PHENYL GLYCINE METHYL POTASSIUM SALT: From Singapore: Ranbaxy Laboratories, 4,000 Kgs., Rs. 12,46,294.

D(+) TARTARIC ACID: From Argentina: Themis Chemicals Ltd., 18,000 Kgs., Rs. 7.93,447.

DESMODUR L 75: From FRG: New Vinod Silk Mills Pvt. Ltd., 240 Kgs., Rs. 12,692.

DESMODUR T 80: From Belgium: Juhi Jain Traders Pvt. Ltd., 13,500 Kgs., Rs. 4,38,022.

DL-(N)-BUTYL TIN DICHLORIDE: From FRG: Gandhi Parekh Invest. Corpn. Ltd., 2,000 Kgs., Rs. 2,37,552.

DICHLORO ACETYL CHLORIDE: From FRG: Camlin Ltd., 2,000 Kgs., Rs. 73,888.

DICHLORO AMINO DIPHENYL ETHER: From France: Progressive Dyestuff, 161 Kgs., Rs. 27,361.

2,4 DICHLORO BENZYL C RIDE: From FRG: Jai Pvt. Ltd., Kgs., Rs. 2,25,381.

3,4 DICHLORO NITRO ZENE: From FRG: Sudarshan ical Inds., 7,000 Kgs., Rs. 3,29,

DICYANDIAMIDE: From Himachem Laboratories, 16,000 Rs. 4,24,405.

DIETHYL ANILINE: From Sudarshan Chemical Inds., 3,040 Rs. 1,77,506.

DIETHYL SULPHATE: Japan: Ahmedabad Chemical Pv 15,640 Kgs., Rs. 3,31,888.

DIHYDRO ISOJASMON From Netherlands: Industrial P ers Ltd., 50 Kgs., Rs. 29,780.

1,2 DIHYDRO 2 OXYQUIN LINE: From Hungary: Sando 21,600 Kgs., Rs. 35,89,608.

2,4 DIHYDROXY QUINO From FRG: Rathi Dyechem Pv 19.8 Kgs., Rs. 7,330.

DIMETHYL ACETAMIDE FRG: Morepen Lab Ltd., 1,52 Rs. 44,019; From Turkey: L Pharmaceuticals Pvt. Ltd., 16,00 Rs. 3,58,026.

DIMETHYL CARBONATE France: Ganesh Medicament Pv 1,000 Kgs., Rs. 2,86,225.

DIMETHYL FORMAMIDE Japan: Rallis India Ltd., 15,20 Rs. 2,77,220.

DIMETHYL OCTANOL: Fr The Tata Oil Mills Co. Ltd., 2,3 Rs. 3,05,602.

DIMETHYL SULPHOXIDE Japan: Parag Pharmaceuticals 1,980 Kgs., Rs. 57,647.

DIOCTYL TIN OXIDE: Fro Gandhi Parekh Invest. Corp 1,020 Kgs., Rs. 1,64,816.

1,4 DIOXANE: From Japan: Chem Private Limited, 1,00 Rs. 35,833.

HENYL GUANIDINE: From C.L. Jain & Co., 4,220 Kgs., 65,624.

HENYL ISIDECYL PHOS-E: From France: Dura Chemical ration Private Limited, 14,400 Rs. 4,45,720.

ULSIFYING WAX: From UK: ce Silicones Pvt. Ltd., 1,000 Kgs., ,793.

)XY RESIN: From Taiwan: nic Components, 300 Kgs., ,030.

HOXY METHYLENE DIE-. MALONATE: From France: E. : (India) Ltd., 7,020 Kgs., ,82,559; From FRG: BEC ficals Pvt. Ltd., 4,000 Kgs., 30,863.

HYL AMYL ALCOHOL: From Lubrizol India Ltd., 66,000 Kgs., ,26,834.

HYLENE GLYCOL DIME-CRYLATE: From USA: Ion nge (India) Ltd., 3,840 Lbs. 94,461.

THYL HEXANOIC ACID: From Kopran Chemical Co. Ltd., 2,035 Rs. 43,559.

TYL VANILLIN: From Japan: Industrial Enterprises, 500 Kgs., 34,899.

GENOL: From Singapore: The Oil Mills Co. Ltd., 2,000 Kgs., 60.508.

RFURYL ALCOHOL: From m: Alchemi Pvt. Ltd., 6,960 Kgs., 01,665.

MMA FERRIC OXIDE: From Jai Electronic Industries Private d, 22,000 Kgs., Rs. 10,69,497.

MMA PICOLIN: From Japan: Chemicals & Products, 3,800 Rs. 1,74,607.

RANIUM OIL BOURBON D.B: France: Gopal Zarda Udyog, 500 Rs. 2,41,005.

GLUE GR 7007: From Taiwan: Asmaco Plastic Inds., 57,420 Kgs., Rs. 9,98,508.

GLYCERYL TRIACETIN: From UK: Precision Rubber Inds., 2,880 Kgs., Rs. 1,09,773.

GUAIACOL: From Italy: Syntho-pharm, 2,000 Kgs., Rs. 1,98,274.

GUM ROSIN 'N' GRADE: From Hong Kong: Sujana Ind. Prod. Mark, 18 MTs., Rs. 1,43,804.

GUM ROSIN WG: From Indonesia: Resins & Plastics Ltd., 36,000 Kgs., Rs. 2,91,545.

HYDRAZINE HYDRATE 100%: From USSR: Hindustan Ciba Geigy Ltd., 2,400 Kgs., Rs. 1,05,369.

HYDROGEN PEROXIDE 50%: From Australia: Excel Inds. Ltd., 40,950 Kgs., Rs. 4,44,630.

3 HYDROXY QUINOLINE 4-CARBOXYLIC ACID: From FRG: Chemiequip Ltd., 240 MTs., Rs. 83,854.

HYDROXYLAMINE HYDROCH-LORIDE: From FRG: Kantilal Manilal & Co., 500 Kgs., Rs. 43,020.

IMINO DI-ACETIC ACID: From Japan: Excel Inds. Ltd., 43,200 Kgs., Rs. 43,75 620.

IMPACT MODIFIER: From Japan: The Bharat Vijay Mills Ltd., 1 MT., Rs. 43,274.

IODINE CRUDE: From Japan: The Atul Products Ltd., 1,000 Kgs., Rs. 3,14,721; Eskay Fine Chemicals, 2,000 Kgs., Rs. 6,54,620; Lub Chem, 1,000 Kgs., Rs. 3,11,574; Santosh Pharmaceuticals, 1 MT., Rs. 3,08,112.

IODINE CRUDE 99.5%: From China: Auro Impex Pvt. Ltd., 5,000 Kgs., Rs 15,34,264.

ISOBORNYL CYCLO HEXANOL: From France: Hindustan Lever Ltd., 2,000 Kgs., Rs. 3,49,340; Tata Oil Mills Co. Ltd.. 1,000 Kgs., Rs. 1,79,391.

ISOBORNYL METHOXY CYCLO HEXANOL: From Japan: Industrial

Perfumes Limited, 540 Kgs., Rs. 98,995.

ISOCYANATE: From Italy: Meenakshi Polymers Pvt. Ltd., 5,405 Kgs., Rs. 2,11,655; From Japan: Dr. Beck & Co. India Ltd., 17,000 Kgs., Rs. 7,21,482.

ISOPROPYL ALCOHOL: From UK: Indian Shaving Products Ltd., 756 Kgs., Rs. 17,820.

L-LYSINE MONO HCl: From Japan: Bombay Pharma Products, 2,000 Kgs., Rs. 1,31,082.

L-LYSINE HCl: From Japan: Chemicals (India), 2,000 Kgs., Rs. 1,41,624.

LACTIC ACID: From China: Paresh Chemical Corpn., 5,675 Kgs., Rs. 1,06,979.

LILIAL: From Switzerland: The Tata Oil Mills Co. Ltd., 2,040 Kgs., Rs. 7,63,680.

LINALOOL: From USA: Oriental Aromatics, 2,904 Kgs., Rs. 3,88,248.

LITHIUM CARBONATE IP/USP: From Yugoslavia: E. Merck (India) Ltd., 300 Kgs., Rs. 63,731.

MERCURY: From Finland: Grasim Inds. Ltd., 260 Nos., Rs. 12,06,955.

METHYL CHLOROFORMATE: From Hungary: Rokadia Chemicals Company Private Limited, 6,200 Kgs., Rs. 1,26,832.

METHYL DIHYDORJASMONATE: From Japan: Hindustan Lever Ltd., 1,080 Kgs., Rs. 4,24,873.

METHYL METHACRYLATE MONOMER: From UK: Dental Products of India Ltd., 1,850 Kgs., Rs. 65,501.

METHOXY METHYLENE MALONIC ACID ESTER: From FRG: IPCA Labs Pvt. Ltd., 6,000 Kgs., Rs. 11,70,761.

3-METHYL THIOPHENE: From UK: Peak Agencies Pvt. Ltd., 1,200 Kgs., Rs. 5,22,267.

MORPHOLINE: From UK: Polyolefins Inds. Ltd., 32.76 MTs., Rs. 10,49,063.

MUSK KETONE: From Switzerland: Gupta & Co. (P) Ltd., 250 Kgs., Rs. 1,14,736.

N-N DIMETHYL M-TOLUAMIDE: From USA: Dr. Sabharwal's Bulk Drugs Ltd., 204 Kgs., Rs. 27,436.

N-METHYL PIPERAZINE: From FRG: Chemipharm Chemical & Pharm., 900 Kgs., Rs. 1,46,317.

NAPHTHENIC ACID: From Belgium: Indrol Lubricants Specialities, 14,440 Kgs., Rs. 2,17,355; From FRG: Modern Chemicals & Plastics, 5,070 Kgs., Rs. 70,646; Tech Bright Chemical Inds. Pvt. Ltd., 5,850 Kgs., Rs. 76,849.

NICKEL CATALYST: From N erlands: The Vegetable Vitamin F Co., 15,000 Kgs., Rs. 19,35,533.

5-NITRO 2-FURFURALDEH DIACETATE: From Netherl Curefast Drugs & Intermediates, Kgs., Rs. 1,28,406.

OCTAMETHYL CYCLO TE SILOXANE: From UK: Reliance cones Pvt. Ltd., 27,360 Rs. 12,48,748.

OIL PEPPERMINT PIPER From France: Balsara Hygiene Pr Ltd., 2,000 Kgs., Rs. 9,29,236.

ORGANIC SURFACE AC AGENT: From USA: Weston C nents Ltd., 1,043 Kgs., Rs. 70,

PARA CHLORO META CR From FRG: Rallis India Ltd., 20 Rs. 22,763.

PARA CHLORO TOL PURE: From FRG: Arlabs Ltd., Kgs., Rs. 4,53,280.

PARA CHLORO TOLUENI Japan: Searle India Ltd., 15,00 Rs. 4,12,078; From USA: Rall Ltd., 24,494 Kgs., Rs. 6,64,38

PARAFORMALDEHYDE PRILLS: From Spain: Shriji Ch 5,000 Kgs., Rs. 39,340; Su Chemical Inds. Ltd., 10,00 Rs. 94,416; Gupta Trading Co. Kgs., Rs. 1,58,619; Jadavji 18,000 Kgs., Rs. 1,64,284.

ARAFORMALDEHYDE 91% LLS: From Spain: Speciality Chem- s, 5,000 Kgs., Rs. 39,340.

ARA OCTYL PHENOL: From an: Atsuan Chemical Corpn., 2,000 s., Rs. 50,355; Indian Plastics Ltd., 00 Kgs., Rs. 1,51,066; United Pes- uem & Nonionics Pvt. Ltd., 2,000 s., Rs. 50,355.

ARA TERTIARY BUTYL ENOL: From Japan: Indian Plastics ., 4,000 Kgs., Rs. 88,122.

ATCHOULI OIL: From Indonesia: ita Chemical Company, 750 Kgs., 1,41,624.

ERCHLORO ETHYLENE: From G: Anshul Chemicals Pvt. Ltd., 760 Kgs., Rs. 1,66,793; DSP Air ia, 18,762 Kgs., Rs. 2,40,760.

HENYL XYLYL ETHANE: From an: Hind Condensor Ltd., 3,000 s., Rs. 94,416.

IVALOYL CHLORIDE: From A: Kaytee Corpn., 1,598 Kgs., 1,00,220.

OLYETHER POLYOL: From y: Sunpra Ener & Rec. Engg. Pvt. l., 4,410 Kgs., Rs. 1,31,852.

OLYVINYL ALCOHOL: From an: Industrial Dispersions, 1,000 s., Rs. 47,208; Manar Size Pvt. Ltd., 00 Kgs., Rs. 1,43,985; Sachin Sizers t. Ltd., 4,000 Kgs., Rs. 2,01,422; Vareli Textiles Inds. Ltd., 3 MTs., Rs. 1,41,624.

POLYVINYL PYROLIDONE: From USA: Abbott Labs I Ltd., 1,000 Kgs., Rs. 1,48,863.

POTASSIUM CARBONATE: From Japan: G. Amphray Laboratories, 17,500 Kgs., Rs. 1,73,490.

POTASSIUM CHLORATE: From Sweden: Wimco Ltd., 98,000 Kgs., Rs. 64,332.

POTASSIUM CRYOLITE: From FRG: Advani-Oerlikon Ltd., 500 Kgs., Rs. 39,784.

PROPIONIC ACID: From FRG: Calpro, 16,380 Kgs., Rs. 1,99,368.

PROPIONIC ANHYDRIDE: From Japan: Alembic Chemicals Works Co. Ltd., 3,040 Kgs., Rs. 1,37,508; Chemifine, 1,080 Kgs., Rs. 45,020; Kiran Chemicals, 1,080 Kgs., Rs. 45,149.

PROPYLENE DIAMINE: From Japan: Jai Electronic Inds. Pvt. Ltd., 1 Kgs., Rs. 10,462.

PROPYLENE OXIDE CONDENSATE OF ETHYLENE GLYCOL: From UK: Kubo Combustion Efficiency Chemicals, 12,160 Kgs., Rs. 3,66,560.

PROPYLENE GLYCOL USP: From Japan: Rallis India Ltd., 16,170 Kgs., Rs. 3,43,500; From USA: American Dry Fruit Stores, 67,940 Kgs., Rs. 13,14,728; Revex Plasticisers Pvt. Ltd., 16,770 Kgs., Rs. 3,43,062; From Singapore: Rallis India Ltd., 50,310 Kgs., Rs. 9,88,998.

RUBBER CHEMICALS: From Korea: Govind Rubber Ltd.,, 5,600 Kgs., Rs. 2,07,086.

SILICON CARBIDE GRAINS: From FRG: Diamond Carbon & Graphite Product, 18,000 Kgs., Rs. 3,26,810.

SILICONE OIL: From FDR: Hico Products Ltd., 5,000 Kgs., Rs. 1,81,350.

SILICONE RESIN: From USA: Garware Plastics & Pulverising Ltd., 485 Kgs., Rs. 50,006.

STANNOUS OCTOATE: From Switzerland: Bharat Petro Foam Co. Pvt. Ltd., 500 Kgs., Rs. 77,296.

SULPHOL LIQUID: From UK: SF Chemical Inds. Pvt. Ltd., 25,000 Kgs., Rs. 1,01,370.

SYNTHETIC RED OXIDE: From FRG: IEL Ltd., 5,000 Kgs., Rs. 1,03,835.

TARTARIC ACID: From Italy: Vimpex Dye Chem Pvt. Ltd., 20 Kgs., Rs. 4,32,325.

TERTIARY BUTYL HYDROQUINONE: From UK: Bombay Oil Inds., 150 Kgs., Rs. 56,769.

TERTIARY BUTYL PERBENZOATE: From FRG: BASF India Ltd.,

1,500 Kgs., Rs. 1,21,504.

TETRA N-BUTYL TIN: From FRG: Aryavart Chemicals Pvt. Ltd., 600 Kgs., Rs. 78,065.

THIO ACETIC ACID: From FRG: Wockhardt Ltd., 600 Kgs., Rs. 1,19,615.

TITANIUM DIOXIDE: From FRG: The Bombay Burmah Trading Corpn., 2,000 Kgs., Rs. 94,117; Jagatjit Cotton Text. Mills Ltd., 17,500 Kgs., Rs. 7,44,827.

2,3,6 TRIMETHYL PHENOL: From FRG: E. Merck India Ltd, 4,940 Kgs., Rs. 4,39,548.

TRIMETHYLOL ETHANE: From Japan: Asian Paints India Ltd., 5,000 Kgs., Rs. 2,13,223.

3,4,5 TRIMETHOXY BENZALDEHYDE: From China: Med Concepta Lab., 500 Kgs., Rs. 1,50,279; Shaba Chemicals Pvt. Ltd., 1,000 Kgs., Rs. 3,14,721.

THIOOCTYL TRIMELLITATE: From UK: Cable Corporation of India Ltd., 2,000 Kgs., Rs. 78,395.

XYLIDINE: From Switzerland: Formokem India Corpn., 1 MT., Rs. 69,083.

VANILLIN: From France: Hindustan Lever Ltd., 1,000 Kgs., Rs. 2,50,203.

ZIRCONIUM OXIDE: From France: Keramic Colours, 1,000 Kgs., Rs. 52,797.

DRUG MATERIALS IMPORTED BOMBAY (From 1.5.89 to 3.5.89)

AMINOPHYLLINE BP 80: From China: Tata Exports Ltd., 1,000 Kgs., Rs. 1,35,653.

CALCIUM D PANTOTHENATE: From Japan: Indian Drugs & Pharmaceuticals Ltd., 800 Kgs., Rs. 1,88,833.

FURAZOLIDONE BP 80: From China: Caplet Pharmaceuticals, 2,500 Kgs., Rs. 2,70,943; K. Mansukhlal & Co., 1,000 Kgs., Rs. 1,13,859.

NOVOLDIAMINE: From FRG: E. Merck I. Ltd., 1,320 Kgs., Rs. 4,29,468.

PEPSIN IP/BP: From FRG: Aristo Pharmaceuticals Ltd., 1,000 Kgs., Rs. 1,30,609.

PHENINRAMINE TARTRATE BP: From USA: Geoffrey Manners & Co. Ltd., 300 Kgs., Rs. 4,22,035.

SODIUM STARCH GLYCOLATE BP/USP: From Hungary: Glindia Ltd., 200 Kgs., Rs. 18,883.

SORBIC ACID USP: From Japan: Kantilal Manilal & Co., 300 Kgs., Rs. 29,977.

SULPHADIAZINE BP 80: From China: Caplet Pharmaceuticals, 2,000 Kgs., Rs. 4,27,391.

THEOPHYLLINE ANHYDROU BP 80: From China: Cipla Ltd., 2,00 Kgs., Rs. 45,005.

DYE MATERIALS IMPORTED BOMBAY (From 1.5.89 to 3.5.89)

FORON BRILLIANT BLUE: Fro Switzerland: S.F. Dyes, 325 Kg Rs. 1,38,166.

G. SALT: From Japan: Yogesh Dye tuff Products Pvt. Ltd., 1 MT Rs. 1,60,041.

OPTICAL WHITENING AGEN From FRG: Shri Amarsinghji Mills, Kgs., Rs. 28,834.

PALANIL BLUE 5 GE: From Japa Garden Silk Mills Ltd., 2,400 MT Rs. 11,27,158.

RANGOLITE: From FRG: J. Bindal Silk Mills Pvt. Ltd., 4,000 Kg Rs. 2,93,793.

RANGOLITE C: From Czechosl vakia: Chiripal Textile Mills Pvt. Lt 12 MTs., Rs. 1,81,350.

RESINOID LABANDU BROWN: From France: The Tata C Mills Co. Ltd., 600 Kgs., Rs. 59,6

SYNTHETIC ORGANIC DYE TUFFS: From Korea: Jalan Wooll Inds., 1,200 Kgs., Rs. 58,680; Fro Taiwan: Chopra Enterprises, 1,0 Kgs., Rs. 47,208.

AMMONIUM MOLYBDATE
COBALT SULPHATE
MANGANESE SULPHATE
MAGNESIUM SULPHATE
MAGNESIUM OXIDE
STRONTIUM CHLORIDE
SODIUM BROMIDE
ZINC SULPHATE
POTASSIUM IODIDE/IODATE

L C TRADERS
403, "YOGESHWAR",
135/139, Kazi Sayed Street, Bombay-3.

Consumers & Exporters

CONTACT FOR YOUR REQUIREMENTS OF:

- Ibuprofen I.P.
- Sulphamethoxazole I.P.
- Trimethoprim I.P.
- Paracetamol I.P.
- Oxyphen Butazone I.P.
- PTS Amide
- Analgin I.P.
- Metronidazole I.P.
- Diloxanide Furoate I.P.
- Saccharine Sodium I.P.
- Aluminium Hydroxide I.P.
- Aluminium Chloride

NBMC

NAV BHARAT MINERALS & CHEMICALS

8, Haresh Chambers, 313/319, Samuel Street, Bombay-400 003.
Phones: 320510 * 332261 * 343429

HYPO
SODIUM BISULPHITE (Comm./Tech./Photo grade)
SODIUM META BISULPHITE (Comm./Tech./Photo grade)
SODIUM SULPHITE (Comm./Tech./Photo grade)
SODIUM SULPHIDE (Bits/Flakes/Solid)
SODIUM SILICO FLUORIDE (80% & 98%)
SODIUM LAURYL SULPHATE (Needle/Powder)

VORA CHEMI TRADE PVT. LTD.

265, Samuel Street, Bombay 40
Phones: 333762/63/64/325265/

ited by R. Raghavan and published by N.R. Rajagopalan on behalf of owners, Sevak Publications, 306, Shri Hanuman dustrial Estate, Wadala, Bombay-400 031. Madras Office : 27, Begum Sahib 3rd Street, 1st Floor, Mount Road, Madras 0 002. Phone : C/o 831808 and printed by N.R. Rajagopalan at Sevak Publications, 25, North Mada Street, Thiruvan- yur, Madras 600 041. Phone : 419265. Registered with the Registrar of Newspapers for India vide No. R.N. 1972/57.

THE PEOPLE WITH CHEMICAL VISION

DESIZING AGENTS
WETTING AGENTS & DETERGENTS
RESINS UF DMEU DMDHEU HVS ATE AMH MF
NONIONIC SOFTENERS
ANIONIC SOFTENERS
CATIONIC SOFTENERS
REACTIVE SOFTENERS
WAX EMULSIONS
EMULSIFYERS
ANTIRUBBING AGENT
POLYETHYLENE EMULSION
ANTISTATIC AGENTS
STAIN REMOVING AGENTS
LEVEL DYEING AGENT

- DISPERSING AGENT
- SIZE SOFTENERS
- CHELLATING AGENTS
- DEFOAMER
- GUMS
- TURKEY RED OIL
- SOLVENTS
- ANTI-MILDEWING AGENTS
- SILICON EMULSION
- CARRIERS
- MERCERISING AGENT
- POLYVINYL ACETATE EMULSION
- WOOL BATCHING OIL
- BINDERS
- MANY OTHER PRODUCTS FOR VARIOUS INDUSTRIES

ur fully equipped & Modernised Factory at Saki-Vihar lake Road, Powai, Bombay.

Manufactured by:

Chemox®

CHEMOX® INDUSTRIAL CORPORATION

oble Chambers, 4th Floor, A.S.Brelvi Road, Bombay 400 001.
ables: "GLYCOPRIT"
hones: Office: 287 01 33 • 287 41 19
Factories:
Saki Naka, Powai: 58 44 87 • 58 69 86

ANTED: Distributors/Stockists in Unrepresented Areas.